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Jury Hanson AFCEE/EST

Work Plan for an
Engineering Evaluation/Cost Analysis
In Support of the Intrinsic Remediation
(Natural Attenuation) Option



Plattsburgh Air Force Base Plattsburgh, New York

Prepared For

Air Force Center for Environmental Excellence Brooks Air Force Base San Antonio, Texas

and

Plattsburgh Air Force Base Plattsburgh, New York

November 1993

AQMOI-03-0492

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SECTION 1

INTRODUCTION

This work plan was prepared by Engineering-Science, Inc. (ES) and presents the scope of work required for the collection of data necessary to conduct an engineering evaluation/cost analysis (EE/CA) for remediation of groundwater contaminated with fuel hydrocarbons and chlorinated solvents at the former Fire Training Area (FT-002) at Plattsburgh Air Force Base (AFB), Plattsburgh, New York. Several remedial options will be evaluated during the EE/CA, including removal of remaining free-phase petroleum hydrocarbons not extracted during an earlier removal action (E.C. Jordan Co., 1990); groundwater extraction, treatment, and reinjection (i.e., pump and treat); air sparging; installation of a reactive wall; and in situ contaminant attenuation through natural processes (intrinsic remediation option) coupled with long-term monitoring. All hydrogeological and groundwater chemical data necessary to evaluate the various remedial options will be collected under this program; however, this work plan is oriented toward the collection of hydrogeological data to be used as input into the Bioplume II® groundwater model in support of the natural attenuation remedial option (intrinsic remediation) coupled with long-term monitoring for restoration of groundwater contaminated with fuel-related compounds, chlorinated solvents, and limited free-phase petroleum hydrocarbons.

As part of the EE/CA, the Bioplume II® modeling effort has four primary objectives:

- Determine the fate and transport of fuel-related hydrocarbon compounds and chlorinated solvents dissolved in groundwater at the site;
- Assess the potential for, and rate of, degradation of both fuel hydrocarbons and chlorinated solvents by indigenous microorganisms;
- Assess the possible risk to potential downgradient receptors; and
- Provide technical support for the evaluation and potential selection of the natural attenuation remedial option.

This work plan was developed based on several discussions among representatives from the Air Force Center for Environmental Excellence (AFCEE), Plattsburgh AFB, Applied Research Associates (ARA), the U.S. Environmental Protection Agency (USEPA), and ES, and on a review of existing site characterization data. The EE/CA evaluation and the Bioplume II® modeling effort each involve completion of several tasks, which are described in the following sections.

All necessary field work will follow the health and safety procedures presented in the program Health and Safety Plan for Bioplume II® Modeling Initiative (ES, 1993) and the site-specific addendum to the program Health and Safety Plan, which has been submitted to USEPA. This work plan was prepared to coordinate the activities of all agencies involved in the EE/CA, including ES, AFCEE, Plattsburgh AFB, ARA, and USEPA.

1.1 SCOPE OF CURRENT WORK PLAN

The ultimate objective of the work described herein is to provide an EE/CA for remediation of groundwater contamination at the former Fire Training Area (FT-002) at Plattsburgh AFB, New York. However, this project is part of a larger, broad-based initiative being conducted by AFCEE in conjunction with USEPA and ES to document natural contaminant biodegradation by indigenous microorganisms and resulting attenuation of fuel hydrocarbons and possibly chlorinated solvents dissolved in groundwater, and to model such degradation using the Bioplume II® numerical groundwater model. For this reason, the work described in this work plan is directed toward the collection of data in support of this initiative, as well as data required to provide a 30-percent design of a groundwater remediation system, should intrinsic remediation not prove to be a viable remedial option at this facility. This work plan describes the specific site characterization activities which will be performed in support of the EE/CA and the Bioplume II® modeling effort.

Proposed site characterization activities include cone penetrometer testing and soil and groundwater sampling. Cone penetrometer testing, soil and groundwater sampling, and analytical protocols are described herein. Existing site-specific data and data collected during the supplemental site characterization activities described herein will be used as input for the Bioplume II® model. Detailed information on the unsaturated and saturated materials present at the site is available from several sources, including the draft FT-002 soil remedial investigation report prepared by ABB Environmental Services (ABB, 1992), the phase II groundwater remedial investigation report for the site prepared by ABB and URS Consultants, Inc. (ABB/URS, 1993), and the draft FT-002 groundwater operable unit feasibility study report prepared by URS (1993). These reports were used to develop an understanding of the potential nature and extent of contamination at the site, to develop a preliminary conceptual fate and transport model, and to supplement model input data.

This work effort will also represent an evolution in the intrinsic remediation program because proposed site characterization and modeling efforts will attempt to quantify the potential for co-metabolism of dissolved fuel-related components and chlorinated solvents at the site. Sensitivity analyses will be conducted for the parameters which are known (or suspected) to have the greatest influence on the results of the Bioplume II® model, and where possible, the model will be calibrated to historical site data. Upon completion of the Bioplume II® modeling effort, ES will provide technical assistance during regulatory negotiations to support the intrinsic remediation/long-term monitoring remedial option, if the results of the modeling indicate that this approach is appropriate. If it is shown that intrinsic remediation is not

the most appropriate remedial option, ES will recommend the most appropriate groundwater remedial technology based on available data.

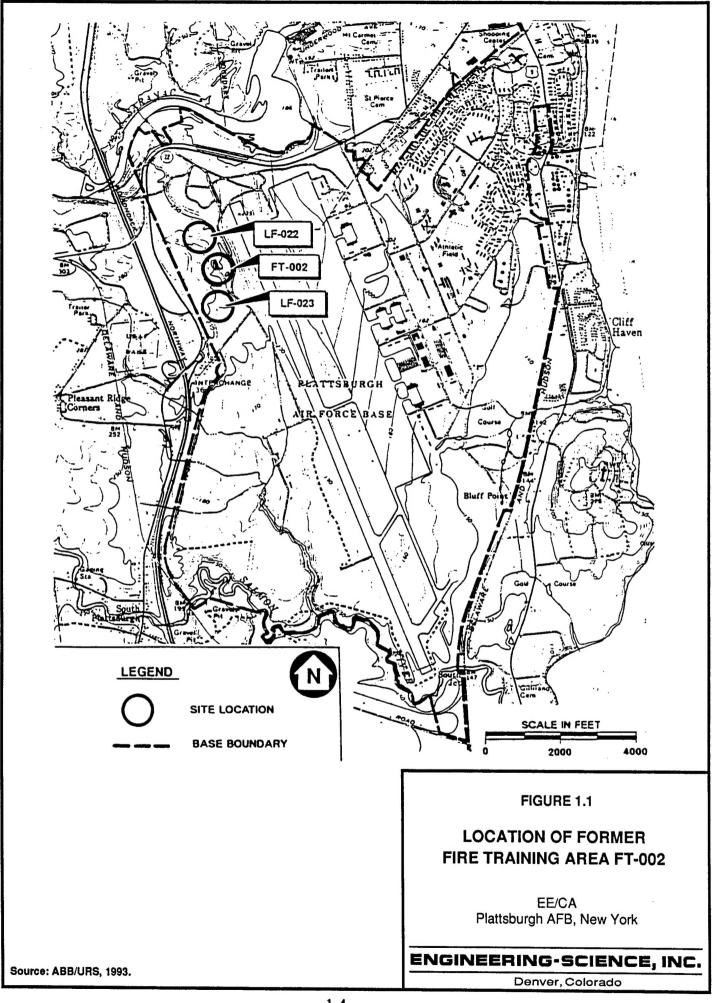
This work plan consists of six sections, including this introduction. Section 2 presents the existing site-specific data and a conceptual model for the site. Section 3 describes the proposed sampling strategy and procedures to be used for the collection of additional site characterization data. Section 4 describes the remedial option evaluation procedure and EE/CA report format. Section 5 describes the quality assurance/quality control (QA/QC) measures to be used during this project. Section 6 contains the references used in preparing this document. There are two appendices to this work plan. Appendix A contains a listing of the containers, preservatives, packaging, and shipping requirements for necessary site characterization samples. Appendix B contains a summary of existing soil and groundwater analytical data from previous field investigation work.

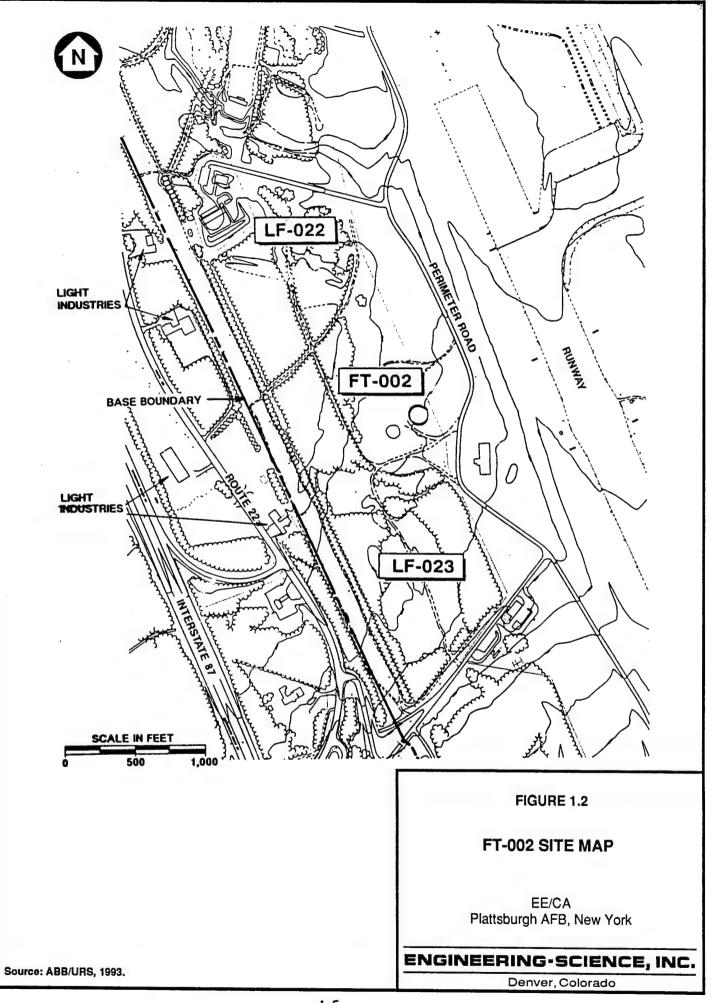
1.2 SITE BACKGROUND

Plattsburgh AFB is located in northeastern New York State and is bordered on the north by the City of Plattsburgh, on the south and west by the Town of Plattsburgh, and on the east by Lake Champlain. The base covers 4,795 acres, 3,365 of which are federally owned and controlled by the military, and 1,430 of which are registered as easement tracts (ABB/URS, 1993). Site FT-002 is approximately 700 feet wide and 800 feet long. The FT-002 site, formerly designated FT-001, is located approximately equidistant (500 feet) between the Plattsburgh AFB runway to the east and the base boundary to the west. Site FT-002 is located south of domestic waste landfill LF-022 and north of domestic waste/spent munitions landfill LF-023 (Figures 1.1 and 1.2). Previous remedial investigation studies indicated that these sites are not contributing an appreciable mass of contamination to groundwater affected by FT-002 operations; both source areas (LF-022 and LF-023) are to be covered under separate remedial action implementation programs to minimize exposure risks from the surface soil pathway.

Site FT-002 is situated in a limited-access area. Access from the east is restricted by the controlled-access areas of the active runway to the east; access from the west is somewhat less restricted, although the area is bounded by a 4-foot-high, three-wire fence. Access from the north and south is generally limited by the LF-022 and LF-023 areas, respectively. Figure 1.1 is a regional location map showing the position of FT-002 relative to Plattsburgh AFB and the surrounding area. Figure 1.2 is a site map showing FT-002 and the immediately adjacent area in detail.

Site FT-002 was used to train base fire-fighting personnel from the mid- to late-1950s until the site was permanently closed to fire training activities on May 22, 1989. During fire training exercises, fires were ignited in four fire training pits located in the FT-002 area. The pits usually were saturated with water before approximately 75 to 100 gallons of fuel was added and ignited. The fuel for the fire pits consisted mainly of waste jet fuel (JP-4) mixed with waste oil. Solvents and other chemicals were sometimes mixed with the fuel. A single training exercise usually consisted of four consecutive cycles of igniting and extinguishing fires in the training pits. Prior to the 1980s, a maximum of 2,000 gallons of fuel was burned each day during weekly fire training exercises (Radian, 1985). Previous site investigations have suggested training





activities may also have been conducted in an area north and west of the pits (ABB/URS, 1993).

Several site investigations have been conducted since the spring of 1984 to support the characterization of potential soil and groundwater contamination. A preliminary assessment of the site was completed in 1985 (Radian, 1985); a site inspection (E.C. Jordan, Co., 1989a) and a phase I remedial investigation were completed in 1988 (E.C. Jordan, Co., 1990); a free-product recovery pilot test was conducted in 1989 (E.C. Jordan, Co., 1989b, 1991a); a drainage flow study was completed in 1990 (E.C. Jordan Co., 1991b); a soil remedial investigation was completed in 1991 (ABB, 1992); and a phase II groundwater remedial investigation was completed in 1991 (ABB/URS, 1993).

The results of these investigations indicate that the soil and groundwater associated with each fire training pit is contaminated with JP-4-related compounds and chlorinated solvents. The former storage tank and oil/water separator that served Pits 2 and 3 have also been identified as potential sources of soil and groundwater contamination. Free-phase product is also present in the capillary fringe and possibly floating on top of the groundwater table in some areas (e.g., downgradient of Pit 1, Pit 4, and the oil/water separator).

A previous removal action at the FT-002 site was conducted in 1989 to pump free-phase product located downgradient of Pit 1 (E.C. Jordan, 1990). Both active and passive product recovery systems were pilot tested. Data from the pilot tests demonstrated that product removal rates could not be predicted for any particular groundwater product pumping rate (E.C. Jordan, 1990). It is suspected that free-phase product is still present within the capillary fringe and floating on the groundwater table immediately underlying the FT-002 site.

The site-specific data and conceptual model presented in Section 2 are based on a review the results of the aforementioned investigations. A synopsis of site characterization activities conducted to date is provided in Chapter 1 of the phase II remedial investigation report prepared by ABB/URS (1993).

SECTION 2

DATA REVIEW AND CONCEPTUAL MODEL DEVELOPMENT

Existing site-specific data were used to develop a conceptual model of the groundwater flow system and the nature and extent of contamination at FT-002. This conceptual model will allow collection of additional data in an efficient manner to fill data gaps, to support the Bioplume II® modeling effort, and to evaluate potential remediation technologies. Sections 2.1 and 2.2 present a synopsis of available site data. Section 2.3 presents the preliminary conceptual groundwater flow and solute transport model which was developed based on these data.

2.1 DATA REVIEW

The reports cited in Section 1.2 and available regional data were reviewed, and relevant portions of these data are summarized in the following sections.

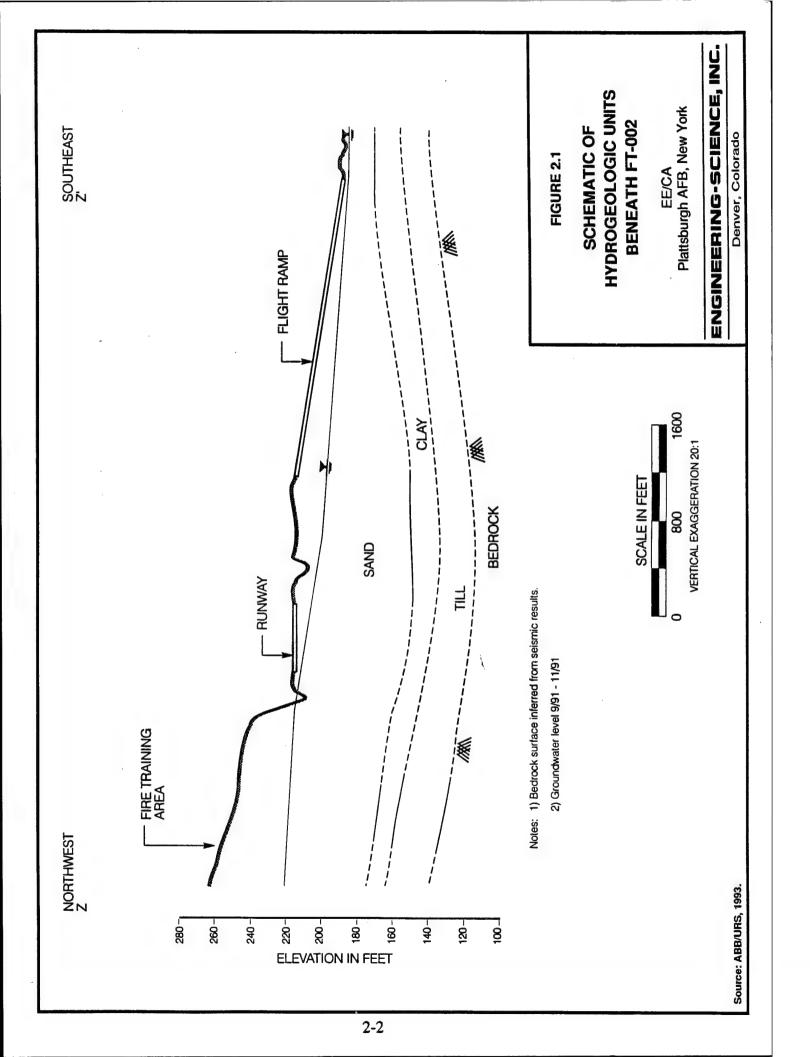
2.1.1 Site Geology and Hydrogeology

The surface topography of Plattsburgh AFB near FT-002 slopes gently eastward toward Lake Champlain and slightly southeastward toward the Saranac and Salmon Rivers, which border the base to the north and south, respectively. Both of these rivers affect the shallow groundwater flow system at Plattsburgh AFB.

The topography in the vicinity of FT-002 was significantly altered by earth moving activities necessary to construct the nearby runway and flightline. The redistribution of soil during these activities created a steep hill just east of FT-002 and an ephemeral gully, which facilitates onsite drainage, between the runway and flightline. These surface modifications may affect groundwater flow and plume migration patterns at the site. The ephemeral gully contains water of probable groundwater origin which discharges into a stream west of the runway during periods of high groundwater levels; this stream flows south through the Weapons Storage Area within the boundaries of Plattsburgh AFB before discharging into the Salmon River.

Four distinct geologic units underlie the site: sand, clay, till, and bedrock. The sand unit generally extends from ground surface up to 90 feet below ground surface (bgs) in the vicinity of FT-002. A 7-foot-thick clay unit has been identified on the eastern side of the site; the thickness of the clay on the western side of FT-002 has not been determined. A 30- to 40-foot thick clay/till unit is also present from 80 to 105 feet bgs in the vicinity of FT-002. Bedrock is located approximately 120 feet bgs.

Three distinct hydrogeologic units have been identified beneath the FT-002 area. Figure 2.1 is a schematic of the subsurface environment at FT-002. Several seismic



refraction surveys, a soil boring program, and a cone penetrometer survey have been completed at the site to provide data necessary to characterize the subsurface environment (ABB/URS, 1993). These investigations indicate that the uppermost aquifer is unconfined and is comprised of well-sorted, medium- to fine-grained sand which extends from the surface to approximately 90 feet bgs on the west side of FT-002 and to approximately 20 feet bgs on the east side of the flightline. The depth to groundwater varies from 0 feet on the eastern side of the site to 35 feet bgs on the western side of the site.

The average horizontal hydraulic gradient along the flow lines emanating from FT-002 to 8,200 feet downgradient is approximately 0.010 foot/foot (ft/ft) toward the southeast (generally toward Lake Champlain). However, northern and southern components of flow also exist because of the effects of the Saranac and Salmon Rivers, respectively. Hydraulic conductivity for the shallow unconfined aquifer measured during *in situ* permeability testing for the FT-002 site ranged from 2.55 feet/day to 13.89 feet/day [9.0 x 10⁻⁴ to 4.9 x 10⁻³ centimeters/second (cm/sec)], with a site average of 11.6 feet/day (Table 2.1). Using an average hydraulic gradient of 0.010 ft/ft (southeastward), and accounting for the variability in porosity in the upper aquifer (30 to 40 percent), the average groundwater seepage velocity in the FT-002 area is calculated to be between 0.29 foot/day and 0.38 foot/day in the southeastward direction. Vertical hydraulic gradients, which vary depending upon location within the aquifer, also are present at the site (Table 2.2). This variability in vertical gradient suggests possible local influences, such as the presence of groundwater surface discharge points and vertical subsurface heterogeneity (ABB/URS, 1993).

Several series of groundwater level (potentiometric) measurements have been taken during different years and seasons. These data suggest that there is minimal seasonal variation in groundwater flow direction at the site. Previous groundwater modeling activities conducted for the phase II remedial investigation used 1991 winter groundwater elevations to calibrate the model. Table 2.3 presents these data, and Figure 2.2 shows typical groundwater potentiometric contour lines.

Immediately underlying the shallow saturated zone is a series of aquitards and aquicludes consisting of silts, clays, and glacial tills which effectively isolate the shallow saturated zone from the deeper, confined bedrock aquifer. The combined thickness of the clay, silt, and till aquiclude has been estimated to be up to 60 feet. Although *in situ* permeability tests were not conducted on these confining materials, hydraulic conductivity values for this unit may be on the order of 10⁻⁷ cm/sec (2.8 x 10⁻⁴ foot/day) (Freeze and Cherry, 1979). Laboratory permeability studies on these materials support the conclusion that little or no appreciable hydrologic connection exists between the upper and lower (bedrock) aquifers, even after sustained exposure of the shallow aquifer to low concentrations of organic solvents such as trichloroethene (TCE) and trans-1,2-dichloroethene (1,2-DCE) (ABB/URS, 1993).

Underlying the confined silt and clay aquiclude is a bedrock aquifer. Although data on this lower aquifer were not collected during recent remedial investigations, early hydrogeologic studies in the region concluded that the bedrock aquifer consists of sandstone and crystalline rock to the west of Plattsburgh AFB and carbonate rock beneath Plattsburgh AFB (Giese and Hobba, 1970). This deep aquifer is confined by

Table 2.1. Hydraulic Conductivity by Depth EE/CA Workplan, Plattsburgh AFB

Well ID#	Test #	Depth(ft)	K (cm/sec)	K(avg)	K(ft/dy)	K(avg)	Unit
MW-02-004	1		0.0043	0.004	12.18	11.19	sand
	2	35-45	0.0036		10.2		sand
MW-02-019	1	9-24	0.038	0.038	107.7	107.7	sand
	2	9-24	0.038	0.01.0	107.7	107.17	sand
MW-02-020	1	30-40	0.0039	0.0039	11.05	11.05	sand
02 020	2	30-40	0.0039	0.000	11.05	11.05	sand
MW-02-021	1	7-17	0.00013	0.0001	11.05	0.397	sand
WI W 02 021	2	7-17	0.00015	0.0001	4.25	0.077	sand
MW-02-022	1	20-30	0.00013	0.0001	0.397	0.397	sand
WI W -02-022	2	20-30	0.00014	0.0001	0.397	0.57	sand
MW-02-030	1	46-55	0.00014	0.0011	2.83	2.98	sand
W W -02-0.50	2	46-55	0.001	0.0011		2.90	
MW-02-033		81-91	0.00017	0.0000	3.12	0.2	sand
M W -02-033	1		1	0.0000	0.198	0.2	
	2	81-91	0.000068		0.193		silty sand/clay interface
2577 00 005	3	81-91	0.000074	0.0000	0.21	0.000	silty sand/clay interface
MW-02-035	1	74-84	0.00019	0.0002	0.539	0.282	silty sand/clay interface
N 4711 00 00 6	2	74-84	0.00022	0.0000	0.624		silty sand/clay interface
MW-02-036	1	28-43	0.009	0.0088	25.51	24.8	sand
	2	28-43	0.0085	0.000	24.09		sand
MW-02-037	1	25-35	0.003	0.0028	8.5	7.8	sand
	2	25-35	0.0025		7.09		sand
MW-02-038	1	45-55	0.00057	0.0005	1.62	1.59	sand
	2	45-55	0.00055	,	1.56		sand
MW-02-039	1	40-50	0.0037	0.004	10.49	11.2	sand
	2	40-50	0.0042		11.9		sand
MW-02-040	1	20-30	0.0034	0.0035	9.64	9.78	sand
	2	20-30	0.0034		9.64		sand
MW-02-041	1	35-45	0.0026	0.0027	7.37	7.51	sand
	2	35-45	0.0027		7.65		sand
MW-02-042	1	52-62	0.0006	0.0006	1.7	1.7	sand
	2	52-62	0.0006		1.7		sand
MW-02-043	1	15-25	0.00038	0.0003	1.08	1.08	sand
	2	15-25	0.00038		1.08		sand
MW-02-044	1	19-29	0.0011	0.0012	3.12	3.26	sand
	2	19-29	0.0012		3.4		sand
MW-02-045	1	13-24	0.00048	0.0004	1.36	1.39	silty sand/clay interface
	2	13-24	0.0005		1.42		silty sand/clay interface
MW-02-046	1	36-46	0.0068	0.0062	19.27	17.67	silty sand/clay interface
	2	36-46	0.0075		21.26		silty sand/clay interface
	3	36-46	0.0044		12.47		silty sand/clay interface
MW-02-047	1	26-36	0.0065	0.0063	18.42	17.71	sand
J	2	26-36	0.006	2.0000	17		sand
MW-02-048	1	6-21	0.0067	0.0061	18.99	17.29	silty sand/clay interface
	2	6-21	0.0055	5.0001	15.59	11.27	silty sand/clay interface
MW-02-049	1	26-36	0.0004	0.0004	1.13	1.21	sand
141 11 UL-U49	2	26-36	0.00045	0.0004	1.13	1.21	sand
MW-04-001	1	6-11	0.00043	0.0001	0.368	0.368	sand
IVI VV -04-001	_	6-11	0.00013	0.0001		0.508	
MW 11 000	2	1		0.0024	0.368		sand
MW-11-009	1	24-34	0.002	0.0024	5.67	6.8	sand
2 40 000	2	24-34	0.0028	0.000	7.94		sand
MW-13-002	1	15-25	0.00069	0.0006	1.96	1.96	silty sand/clay interface
	2	15-25	0.00069		1.96		silty sand/clay interface
MW-16-001	1	10-20	0.012	0.012	34.01	34.01	sånd
	2	10-20	0.012		34.01		sand
Overall average			0.0041		11.62		

Table 2.2. Vertical Hydraulic Gradients EE/CA Workplan, Plattsburgh AFB

	Depth (ft)	Vertical Hydraulic Gradient (ft/ft)					
Well ID#		1/19/89	10/91	11/19/91			
MW-02-021	179.6	NA	0.0066	0.013			
MW-02-022	154.5	//					
MW-02-019	211.7	-0.152	-0.152	-0.152			
MW-02-020	192.6	-0.013	-0.0064	-0.006			
MW-02-030	177						
MW-02-037	197.9	NA	-0.005	-0.005			
MW-02-038	177.8						
MW-04-006	186.4	NA	0.0073	NA			
MW-02-023	159						
MW-02-040	184.4	NA	-0.133	0.112			
MW-02-041	170.1	NA	0.028	0.011			
MW-02-042	152.3						

Source: ABB/URS, 1993

Table 2.3. Potentiometric Measurements Used in Previous Groundwater Modeling Efforts

Coordinates								
Well ID#	East (ft)	North (ft)	MSL (ft)					
MW-02-004	721997	1700173	217.5					
MW-02-009	722238	1700897	217.6					
MW-02-022	723497	1698381	187.3					
MW-02-026	721429	1700757	218.9					
MW-02-030	722809	1700173	213.3					
MW-04-001	726018	1695517	179.4					
MW-04-002	727638	1694950	163.2					
MW-04-003	727537	1696283	166.3					
MW-04-004	727094	1697345	174.9					
MW-04-005	726453	1698997	189.1					
MW-04-006	725097	1698724	190.9					
MW-11-002	729438	1698348	146.8					
MW-11-009	728811	1698193	156.6					
MW-13-002	724729	1695762	171.2					
MW-13-003	724308	1695344	168.9					
MW-13-004	724351	1693198	147.1					
MW-13-005	723495	1694742	152.3					
MW-16-001	725474	1701900	202.4					
MW-21-001	720969	1704131	209.5					
MW-21-003	721399	1704613	195.1					
MW-22-001	721676	1702094	219.3					
MW-22-002	721967	1701673	218.6					
MW-22-004	720758	1701269	228.2					
MW-22-006	721198	1702160	219.8					
MW-23-001	722724	1699319	211.8					
MW-23-004	721656	1699883	217.8					
MW-23-005	721870	1699370	215.5					
MW-23-010	722208	1698564	210.1					
PZ13S PZ12S	730135	1705500	159.2					
PZ12S PZ2S	728755	1701324	170.4					
PZ3S	726130 720682	1702584 1701868	197.8					
PZ11S	728299	1699570	232.9 168.6					
MW-17-005	727817	1698347	169.2					
C C	727331	1698454	175.8					
MW-05-003	727251	1699445	183.9					
MW-06-001	726426	1700080	193.1					
PZ8S	728691	1692547	152.7					
MW-07-003	728356	1691506	149.7					
MW-07-004	727879	1691666	153.3					
PZ7S	726303	1694521	174					
PZ4S	721290	1695294	176.6					
PZ6S	725282	1691585	165.1					

Source: ABB/URS, 1993





LEGEND

MONITORING WELL

GENERAL GROUNDWATER FLOW DIRECTION GROUNDWATER ELEVATION CONTOURS

NOTE:

GROUNDWATER ELEVATIONS BASED UPON STEADY STATE AVERAGE OF DATA FROM 12/87, 1/89, 9/91-10/91, AND 11/91: SEE APPENDIX H.

FIGURE 2.2

POTENTIOMETRIC CONTOUR MAP FOR FT-002

> EE/CA Plattsburgh AFB, New York

ENGINEERING-SCIENCE, INC.

Denver, Colorado

Source: ABB/URS, 1993.

the overlying clay and till layers, although there is some evidence that upward vertical gradients may cause groundwater in the lower, confined aquifer to leak upward into the shallow, unconfined aquifer.

2.1.2 Soil Quality

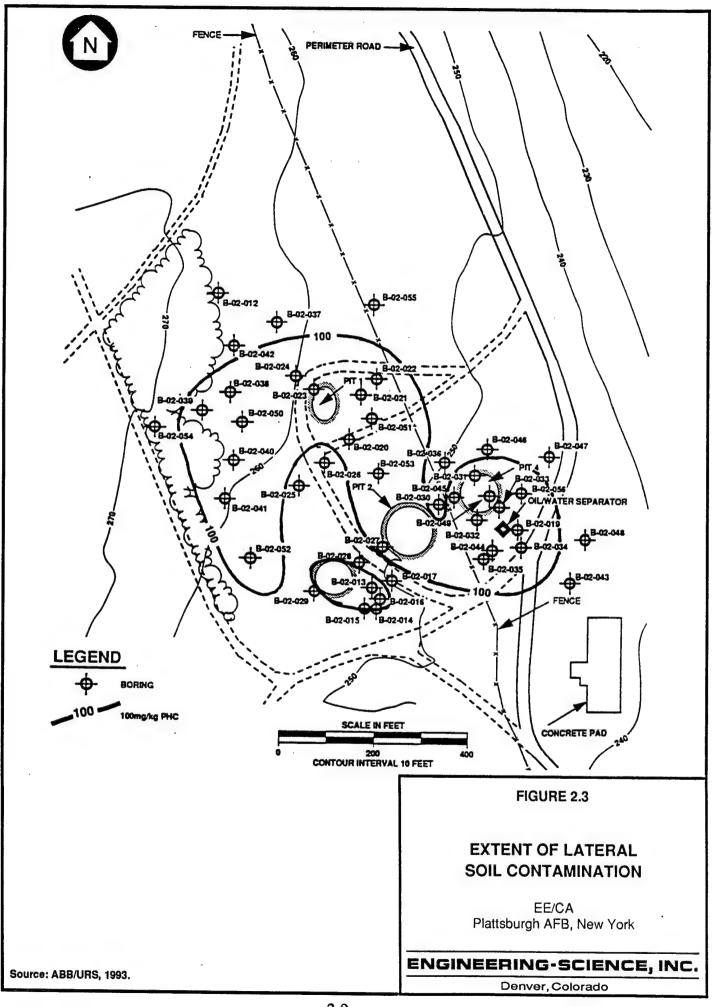
Subsurface soil samples were collected during previous investigations to evaluate the nature and extent of contamination in the subsurface. Sampling continued outward from the center of each area until fuel-related contamination was not detected in the composite samples. Fuel-related compounds and solvents are the primary contaminants at FT-002. During training activities, the soil beneath the pits became saturated with fuels and solvents, and the contaminants migrated downward. Because the fuel/solvent mixture is lighter than water, the downward migration of the contaminants was halted at the groundwater table. Trapped free-phase product, consisting primarily of jet fuel (JP-4) with small amounts of TCE and 1,2-DCE, slowly dissolves into the groundwater, becoming a continuing source of groundwater contamination.

Analyses of subsurface soil samples suggest a general contaminant distribution pattern. Below the pits, concentrations of fuel-related compounds [e.g., petroleum hydrocarbons (PHCs) and polynuclear aromatic hydrocarbons (PAHs)] are seen generally to increase with depth, reaching their highest levels near the groundwater table. Within the zone of groundwater table fluctuation, soil contamination has spread laterally. This lateral spread is likely attributable to the physical and chemical properties of the contaminants, and the resistance to further vertical migration due to the increased moisture content in the soil pores, first in the capillary fringe, and then in the saturated zone. This zone is likely limited to within 5 feet of the seasonally low groundwater table level.

Chemical constituents, including volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were detected in subsurface soils within and adjacent to the FT-002 site. The primary VOCs found within the subsurface soils at FT-002 are the solvents TCE and DCE and the fuel-related compounds benzene, toluene, ethylbenzene, and xylenes (BTEX). The primary SVOCs detected in subsurface soils are naphthalene, 2-methylnapthalene, and four phenolics (i.e., phenol, 2-methylphenol, 4-methylphenol, and 2,4-dimethylphenol). Typically, VOC contamination is found several feet below the ground surface rather than in surface soils. Figure 2.3 is a schematic of the lateral extent of soil contamination at FT-002. Appendix B contains analytical data from previous soil investigations.

2.1.3 Groundwater Quality and Chemistry

Groundwater at FT-002 contains a plume of dissolved-phase fuel-related compounds and chlorinated solvents. These plumes originate at FT-002 and extend downgradient toward the runway and taxiway to the east. Based on the distribution of contaminant concentrations, the dissolved-phase plume can be separated into an inner zone called the core plume and an outer, peripheral area. Both the core and peripheral areas of the plume are limited to the shallow, unconfined aquifer at the site. Previous investigations at FT-002 (ABB/URS, 1993) divided the contaminant plume into two zones based on contaminant distribution. For the purposes of the EE/CA, the plume present near FT-002 has been divided into two components based on concentration of



contaminants: the core, which is generally defined by wells that have VOC concentrations greater than 1,000 micrograms per liter (μ g/L), and the periphery of the core plume, which is defined by downgradient wells with a VOC concentration less than 1,000 μ g/L. These zones are referred to as the core plume and the periphery plume, and are schematically illustrated in Figure 2.4. These two zones are discussed in the following sections.

A total of 49 groundwater monitoring wells were installed during previous site investigations. Data from eight additional groundwater monitoring wells, which are located in other sites, are also used to delineate the FT-002 groundwater plume. Figures 2.5a and b show the location of the groundwater monitoring wells within and outside of the FT-002 plume, respectively. Several of these wells contained free product during previous site investigations.

HydroPunch® groundwater samples were also collected in 1990 to evaluate the presence of VOCs (ABB/URS, 1993). Further, a total of 117 groundwater samples were collected at 8- to 15-foot intervals from the 39 cone penetrometer locations associated with the FT-002 remedial investigations. These samples were analyzed for various chlorinated solvents and fuel-related hydrocarbons, including benzene, toluene, ethylbenzene, m/p-xylene, o-xylene, trans-1,2-DCE, cis-1,2-DCE, TCE, and tetrachloroethene (PCE). Appendix B contains sampling locations and results of these sampling efforts.

2.1.3.1 Core Plume

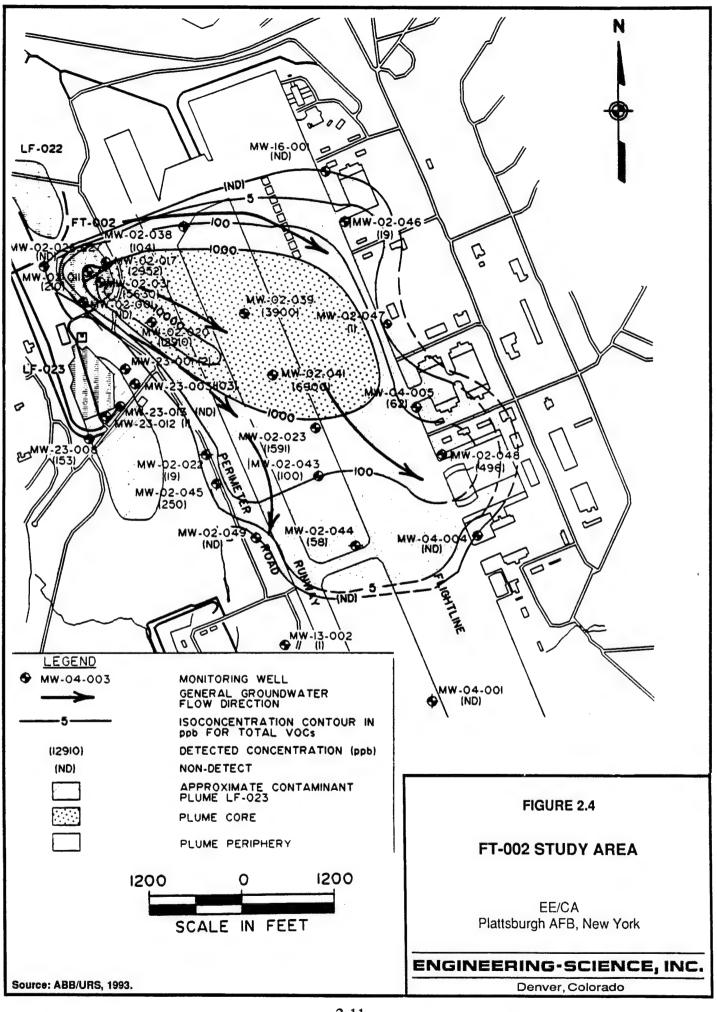
The primary contaminants associated with the core of the plume are the solvents TCE and DCE and the fuel-related BTEX compounds. Ten other VOCs have also been detected in core plume groundwater samples and are considered site contaminants; these VOCs are listed in Table 2.4 with relevant concentration and comparison data.

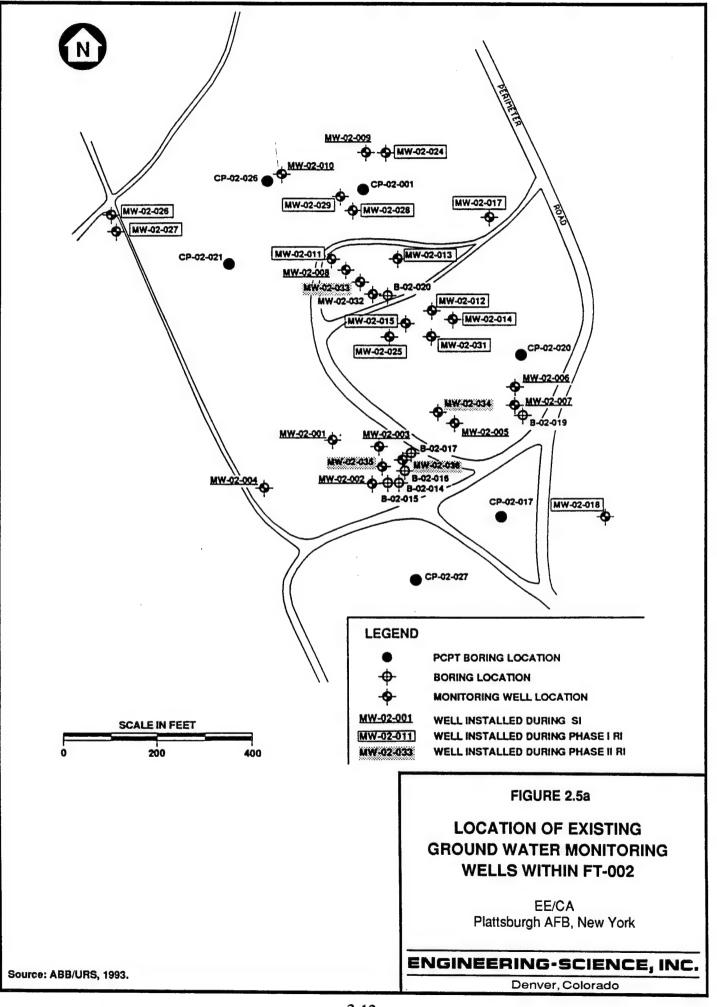
The primary SVOCs detected in groundwater from the core of the plume are naphthalene and four phenolic compounds (phenol, 2-methylphenol, 4-methylphenol, and 2,4-dimethylphenol). The fuel-related compound 2-methylphenol is also considered a core plume contaminant (Table 2.4).

The core groundwater plume in the upper unconfined aquifer also contains significant concentrations of 12 inorganic analytes detected above background concentrations. These inorganic analytes include aluminum, arsenic, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, sodium, and zinc. Because these analytes have been detected above background concentrations, they are considered site contaminants. Magnesium, potassium, and sodium are probably not directly attributable to activities at the FT-002 site. Modeling activities in support of the intrinsic remediation option will only consider organic contaminants.

2.1.3.2 Plume Periphery

Several VOCs, SVOCs, and above-background metals concentrations are present in the periphery of the plume. A list of these contaminants, including key concentration and comparison data, is presented in Table 2.5. In summary, DCE and TCE are the primary VOC contaminants in the peripheral groundwater plume. Four other compounds, vinyl chloride, acetone, carbon disulfide, and 1,2-dichloroethane, are





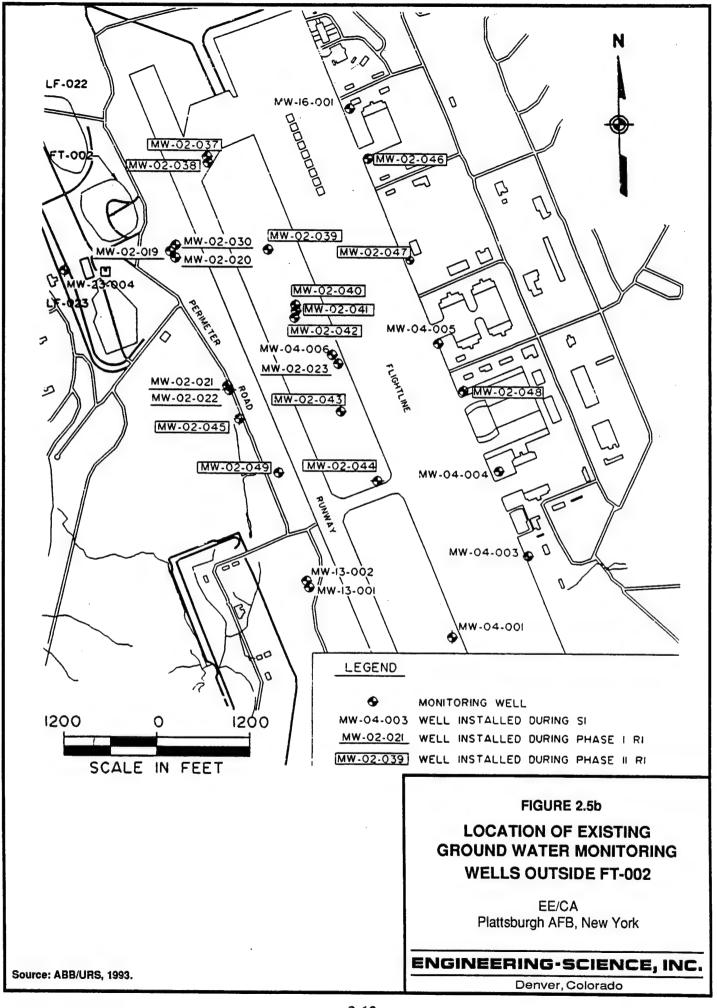


Table 2.4. Summary of Organic Groundwater Contamination (Focus on Plume Core), Plattsburgh AFB

	Backgrou	nd Minimum	Maximum	Chemical-specific	Freq.	Well ID#
Analyte	(ug/L)	(ug/L)	(ug/L)	ARAR (ug/L)	detect?	(max value)
1,1-dichloroethene (DCE)	ND	2		5	2/51	CP-02-020
1,2-dichlorobenzene	ND	1200	1200	4.7	1/38	MW-02-003
1,2-dichloroethane (DCA)	ND	45		5	1/51	CP-02-020
1,2-dichloroethene (total)	ND	7	18000	5	27/51	CP-02-020
1,2-trichloroethane (TCA)	ND	19	19	5	1/51	CP-02-020
2,4-dimethylphenol	ND	12	98	1	8/38	MW-02-020
2-butanone	10	03 11	1	50	9/51	MW-02-007
2-chlorophenol	ND	70	130	1	1/38	MW-02-041
2-hexanone	ND	96	96	50	1/51	CP-02-020
2-methylnapthalene	ND	14	9600	50	11/38	MW-02-003
2-methylphenol	ND	10	17	1	3/38	MW-02-020
4-chloro-3-methylphenol	ND	26	42	1	1/38	MW-02-041
4-methyl-2-pentanone	ND	70	70	50	1/51	CP-02-020
4-methylphenol	ND	18	140	1	8/38	MW-02-020
4-nitrophenol	ND	100	150	1	1/38	MW-02-041
Acenaphtene	ND	780	780	20	1/38	MW-02-003
Acetone	:	23 11	19	50	2/51	B-02-014
Benzene	ND	3	720	0.7	13/51	MW-02-031
Carbon disulfide	ND	1	280	50	3/51	CP-02-020
Chlorobenzene	ND	7	7	5	1/51	MW-02-030
Ethylbenzene	ND	7	1400	5	20/51	MW-02-006
Methylene chloride	ND	11.5	20	5	1/51	B-02-014
Napthalene	ND	26	3700	9	11/38	MW-02-003
Pentachlorophenol	ND	95	140	1	1/38	MW-02-041
Phenanthrene	ND	1700	1700	50	1/38	MW-02-003
Phenol	ND	10	110	1	4/38	MW-02-041
Tetrachloroethene (PCE)	ND	5	52	5	2/51	MW-02-017
Toluene	ND	15	4200	5	16/51	MW-02-025
Total xylenes	ND	6	13000	5	24/51	MW-02-003
Trichloroethene (TCE)	ND	- 4	3900	5	18/51	MW-02-039
bis(2-ethylhexyl)phthalate		35 13	1100	50	6/38	MW-02-003

Source: ABB/URS, 1993

Table 2.5. Summary of Organic Groundwater Contamination (Focus on Periphery Plume), Plattsburgh AFB

	Background	Minimum	Maximum	Chemical-specific	Freq.	Well ID#
Analyte	(ug/L)	(ug/L)	(ug/L)	ARAR (ug/L)	detect?	(max value)
1,1-dichloroethene (DCE)	ND	3	3	5	1/17	CP-02-010
1,2,4-trichlorobenzene	ND	14	14	5	1/13	MW-02-040
1,2-dichloroethane	ND	7	7	5	1/17	CP-02-010
1,2-dichloroethene (total)	ND	1	1	5	12/17	MW-02-040
Acetone	23	130	130	50	1/17	MW-02-020
Carbon disulfide	ND	9	110	50	2/17	CP-02-010
Trichloroethene (TCE)	ND	2	2	5	11/17	MW-02-040
Vinyl chloride	ND	6	6		1/17	CP-02-010

Source: ABB/URS, 1993

considered peripheral-area groundwater contaminants. These compounds are consistent with compounds detected in the source soil area and the free product, and with compounds reported in FT-002 historical operations data. In contrast to the core of the plume, however, 1,2,4-trichlorobenzene is the only SVOC detected in samples from the periphery of the plume.

Eleven inorganic analytes were detected in the periphery of the plume at concentrations exceeding corresponding background concentrations. In general, the inorganic contaminants detected in the peripheral plume appear to be attributable to FT-002 operations based upon background comparisons. However, the wells in which the highest concentrations of inorganic analytes were detected are at the edges of the plume where concentrations of primary organic contaminants are the lowest.

2.1.4 Receiving Surface Water Quality and Chemistry

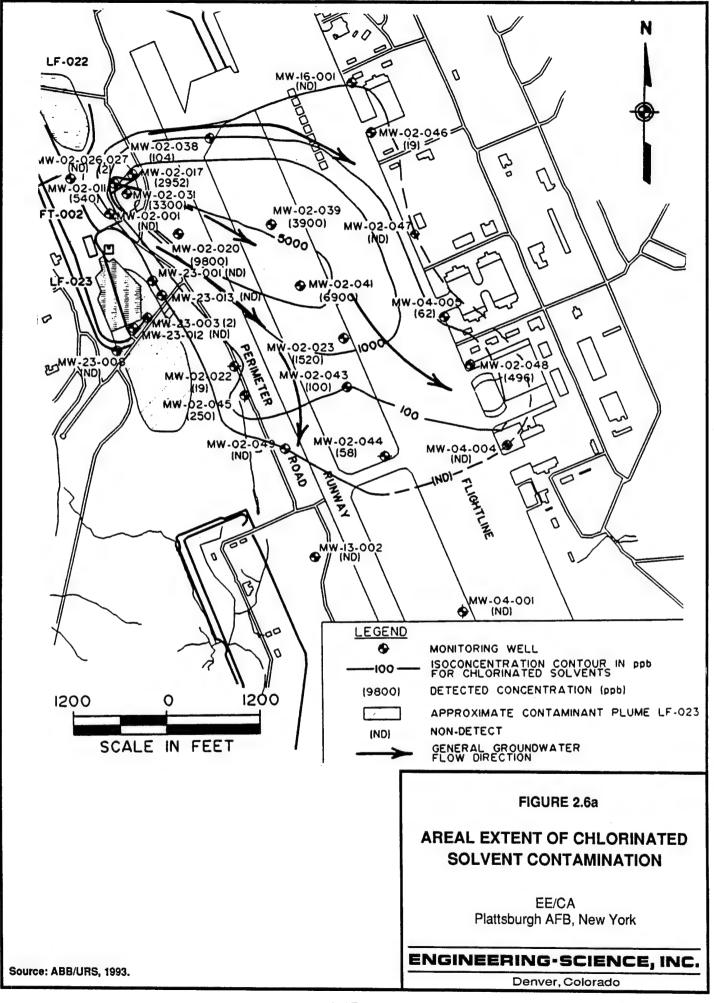
Groundwater discharges into surface water bodies at two locations at the FT-002 site: the stream located in the topographic low in the southwestern portion of the base, and the drainageway between the runway and flightline. TCE and DCE have been detected in samples from the gully outfall at concentrations ranging from 5 to 55 μ g/L and 5 to 110 μ g/L, respectively. TCE and DCE have also been detected in the receiving stream at concentrations of 5 and 11 μ g/L, respectively (ABB/URS, 1993). The consistency of these measured concentrations indicate that groundwater from the FT-002 dissolved contaminant plume may be discharging into the drainageway between the flightline and runway, from which it is being diverted to the stream.

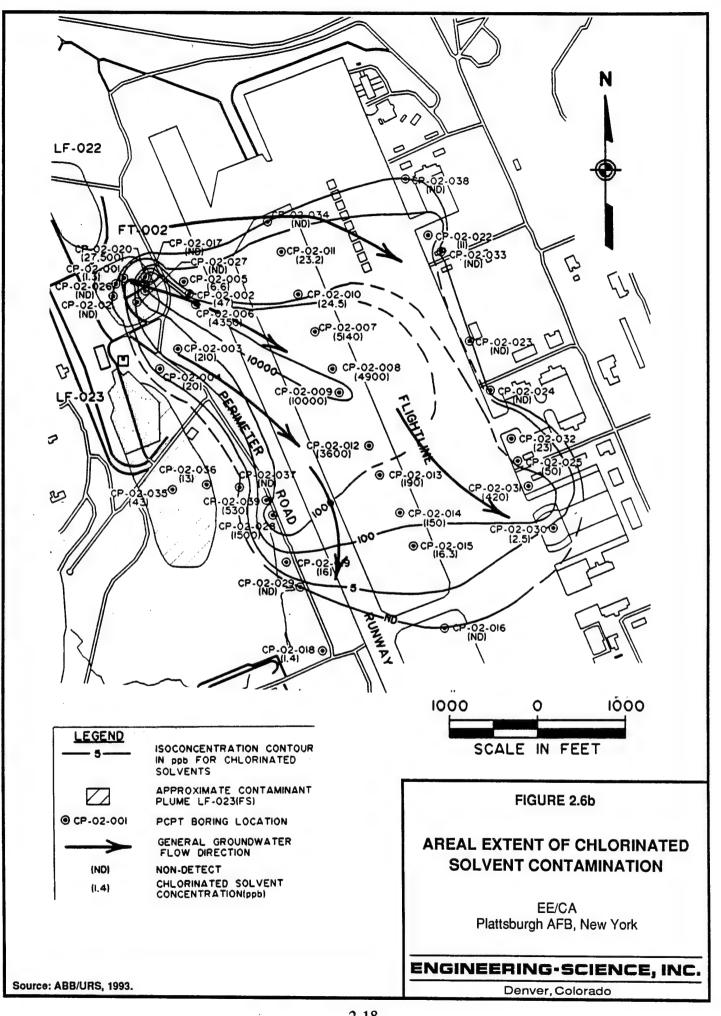
2.2 EXTENT OF CONTAMINATION

As discussed previously, two general types of contaminants are present in the subsurface soils and groundwater at the FT-002: fuel-related BTEX compounds and chlorinated solvents (primarily TCE and DCE). The vertical and horizontal extent and concentrations of these two types of contaminants differ significantly, possibly as a result of differences in source loading and transport and fate properties. Based on existing site data (both groundwater and cone penetrometer data), the nature and extent of the BTEX and chlorinated solvent plumes are discussed separately in detail below.

2.2.1 Extent of Chlorinated Solvent Plume

The core of the chlorinated solvent plume extends southeast from FT-002 beneath the runway, approximately 3,500 feet from the source area (Figures 2.6a and b). The remaining portions of the plume have spread laterally due to groundwater flow processes (with a maximum lateral spread of about 2,500 feet downgradient of the source area). Chlorinated solvent concentrations define the horizontal extent of the total plume, which extends about 5,500 feet downgradient of the FT-002 area. In general, the solvents TCE and DCE have been detected throughout the plume and are the only VOCs detected at the periphery of the plume. Elevated concentrations of chlorinated solvents in the southern portion of the plume could be attributable to an artificial conduit that diverts groundwater along the southern periphery of the plume (ABB/URS, 1993).





The vertical extent of the chlorinated solvent plume is greatly affected by the hydrogeology in the FT-002 area (Figure 2.7). The core of the chlorinated plume is located near the midpoint of the saturated zone within the upper, unconfined aquifer (about 20 feet below the local groundwater table). The vertical migration of the chlorinated solvents from the source area appear to have been limited by the underlying clay layer. Away from the source area, however, the chlorinated solvent plume spreads vertically as well as laterally in the direction of groundwater flow (southeast). Over time, the contaminants appear to have migrated farther laterally than vertically, although significant vertical migration has occurred immediately downgradient of the FT-002 source area to a depth of about 60 feet below the local groundwater table. The lateral spread may be due to the size and long operational life of the source area, the physical and chemical characteristics of the contaminants, and/or the close proximity of influencing rivers that can enhance peripheral spreading of the plume (USEPA, 1989).

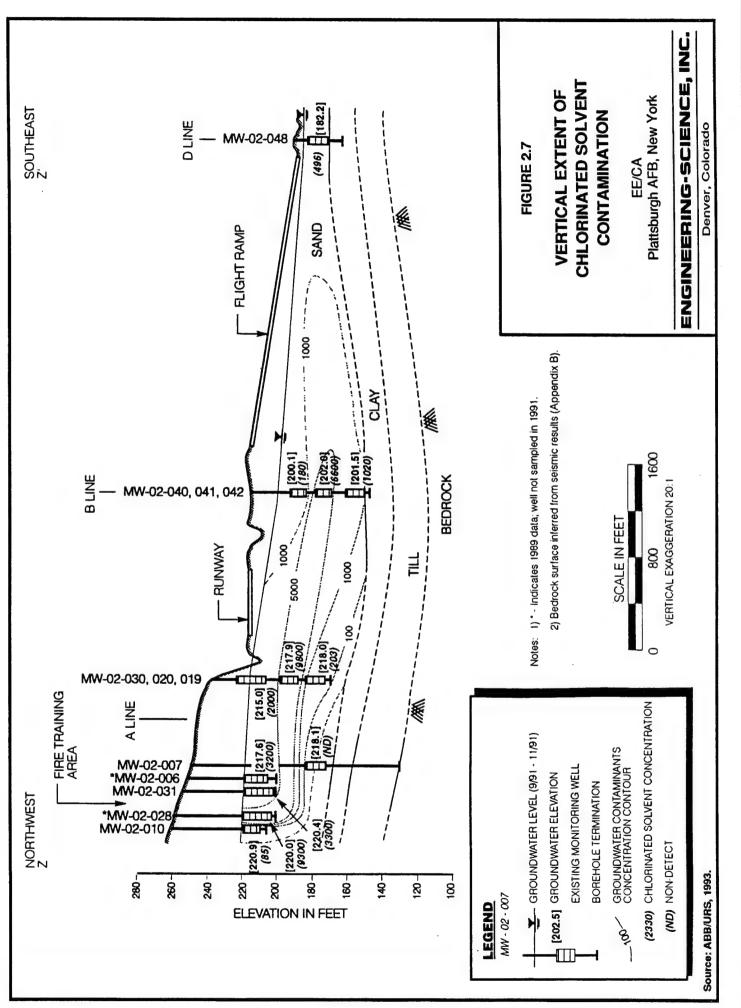
At most monitoring well locations, there also may be a significant component of upward groundwater vertical flow, which may also limit the vertical extent of the chlorinated solvent plume. It is difficult, however, to evaluate with certainty the effect on movement of the chlorinated solvent plume caused by vertical gradients because of other complicating effects which result from local density gradients and stratigraphic heterogeneities.

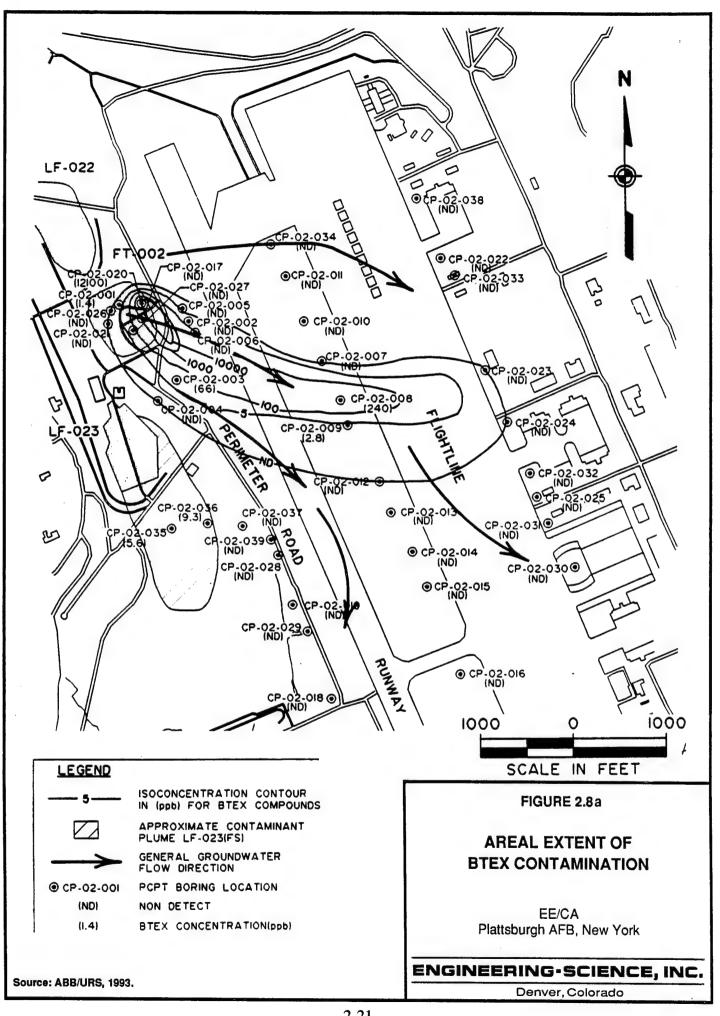
2.2.2 Extent of BTEX Plume

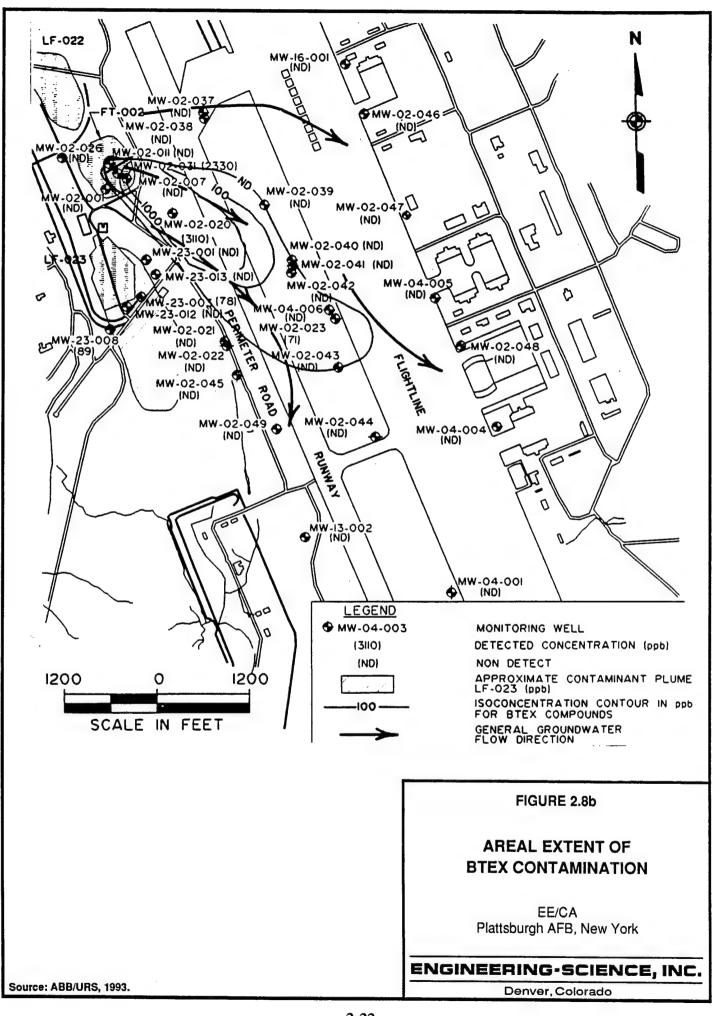
The horizontal extent of the BTEX plume is less than that of the chlorinated solvent plume (ABB/URS, 1993). BTEX compounds were detected primarily near the source area in FT-002 (Figures 2.8a and b). In 1991, the core plume of the BTEX compounds extended approximately 1,000 feet southeast from FT-002 beneath the runway, similar to the chlorinated solvent plume. The peripheral BTEX plume extended 3,500 feet essentially downgradient of the FT-002 source area. Near the FT-002 source area, the vertical extent of the BTEX plume appears similar to that of the chlorinated solvent plume (Figure 2.9). However, BTEX compounds are largely absent in groundwater samples taken away from the source area (e.g., 1,600 feet downgradient). As with the chlorinated solvent plume, the BTEX plume appears to have spread more laterally than vertically over time.

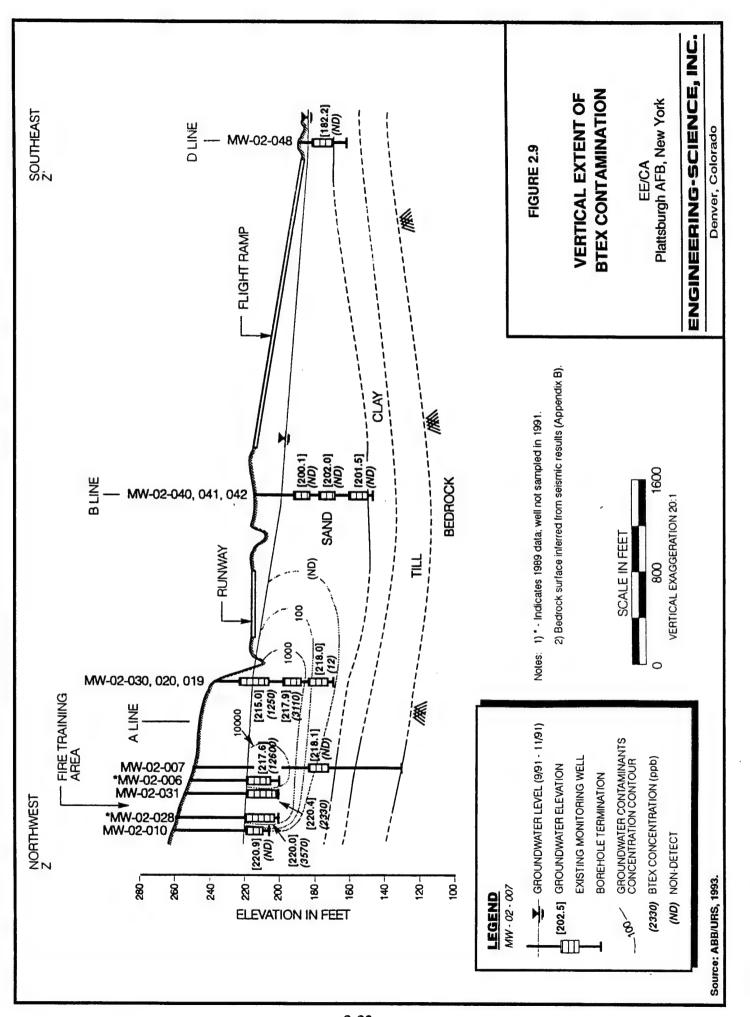
2.3 DEVELOPMENT OF THE CONCEPTUAL MODEL

The development of an adequate site-specific conceptual model is a critical path to determining whether the intrinsic remediation option is a viable remedial alternative for the FT-002 site. A site-specific conceptual model is a three-dimensional representation of the hydrogeologic system at the site based on available geological, hydrological, climatological, and geochemical data. Detailed information on the transport and fate of contaminants of concern in the groundwater system is also necessary to develop an integrated conceptual model that accounts for groundwater flow and contaminant migration. The conceptual model is used to aid in identifying any data gaps that must be filled to support the EE/CA and to help develop the site-specific parameters used in the Bioplume II® model.









Development of a successful conceptual model requires completion of four critical steps: (1) defining the problem to be solved; (2) integrating available site-specific and contaminant-specific data; (3) selecting an appropriate model for the specific site conditions; and (4) identifying any additional data needs. Site and contaminant-specific data are necessary to examine the behavior of the contaminants within model simulations and to determine potentially relevant transport and exposure pathways for the contaminants of concern.

2.3.1 Problem Definition

As discussed previously, the purpose of this study is to determine if the intrinsic remediation option is the most appropriate remedial alternative for the groundwater contamination present at site FT-002 or if a more active remedial alternative is necessary. Two separate classes of contaminants of concern have been identified in the soil and groundwater underlying the FT-002 site: chlorinated solvents and fuel-related BTEX compounds. Thus, the proposed study will seek to determine the transport and fate of both classes of contaminants by simulating contaminant behavior in the subsurface groundwater system under the governing physical and chemical regime. The study will explore, to the extent practicable, the possibility of co-metabolism of site-specific degradable organic contaminants.

2.3.2 Overview of Intrinsic Remediation

Numerous laboratory and field studies have shown that subsurface microorganisms can degrade a variety of hydrocarbons, including components of jet fuel and gasoline (e.g., Lee, 1988; Atlas, 1988; Young, 1984; Alvarez and Vogel, 1991; Jamison et al., 1975; Malone et al., 1993). The moderate- to low-molecular-weight compounds, such as the BTEX compounds, appear to be most amenable to biodegradation. The process of biodegradation of fuel hydrocarbons occurs naturally when an indigenous (and properly acclimated) population of hydrocarbon-degrading microorganisms is present in the aquifer and sufficient oxygen and nutrients are available to these microorganisms.

The rate of natural biodegradation is generally limited by a lack of oxygen rather than by a lack of nutrients, such as natural nitrogen or phosphorus (Borden and Bedient, 1986). Thus, the rate of natural aerobic biodegradation in shallow aquifers is largely dependent upon the rate at which oxygen enters the contaminant plume. Aquifers in sandy soils (such as those underlying the FT-002 site), which provide high transmissivity and vertical reaeration, are excellent candidates for the occurrence of natural biodegradation.

A significant reduction in dissolved oxygen within an existing BTEX plume is a strong indication that indigenous bacteria are actively biodegrading fuel contamination. This inverse relationship is indicative of natural aerobic biodegradation because microorganisms consume oxygen when mineralizing BTEX compounds to carbon dioxide and water. These microorganisms use oxygen as a cosubstrate during the initial stages of hydrocarbon metabolism, and as a terminal electron acceptor for energy production during the later stages (Higgins and Gilbert, 1978; Gibson and Subramanian, 1984; Young, 1984). Contaminant-specific calculations based on the stoichiometry of the mineralization reaction yield the amount of oxygen necessary to support the degradation of the contaminant of concern. A conservative estimate of the

amount of dissolved oxygen necessary to convert total BTEX to carbon dioxide is 3.1 pounds of oxygen per 1 pound of BTEX.

The presence of additional organic degradable compounds may also enhance the degradation of hydrocarbons and/or chlorinated solvents through co-metabolism (Howard, 1990). Co-metabolism has been defined as the biotransformation of one substance not normally used to meet metabolic needs in the presence of another biotransformable substance that can be used to meet metabolic needs. Thus, BTEX compounds could act as the primary substrates that can be used to meet the growth demands of the indigenous microorganisms, although the chlorinated solvents may be fortuitously biotransformed. This secondary biotransformation may be attributable to an increased demand for an additional source of energy and biosynthesis material for bacterial maintenance and growth. Additionally, the need to supplement the specific primary substrate may activate enzymes necessary for the biotransformation of the secondary substrate.

Many recalcitrant organic compounds, such as chlorinated solvents, may be degraded in the presence of more highly concentrated, different compounds that are used to meet the growth and energy requirements of the local biomass (e.g., BTEX compounds). This form of co-metabolism is called secondary utilization, since the recalcitrant compounds become secondary substrates and may or may not provide some energy for growth (McCarty et al., 1981). It is important to note that a secondary substrate does not have to share the same enzymatic pathways as the primary substrate, but the indigenous microorganisms must be capable of biotransforming both compounds.

Specific primary substrates may also be needed to activate the enzymes necessary for biotransformation of recalcitrant organic pollutants. Thus, the enzymes produced by the local biomass to metabolize the primary substrate can interact with the recalcitrant secondary substrate and bring about its biotransformation. Sufficient primary substrate must be available in the system to maintain the biotransforming enzymes in an active state. However, if the primary substrate is present in excessive concentrations, then preferential utilization of the primary substrate may repress utilization of the secondary substrate. This study will explore (to the extent practicable) the potential for cometabolism under the site-specific groundwater conditions at the FT-002 site.

2.3.3 Selection of Model Code

To accomplish the stated purpose of this study, a simulation model must be capable of computing changes in contaminant concentration caused by at least four distinct processes: (1) advective transport, (2) hydrodynamic dispersion, (3) fluid sources (e.g., injection wells, drainageways, receiving surface streams), and (4) reactions (e.g., adsorption, biodegradation, abiotic degradation).

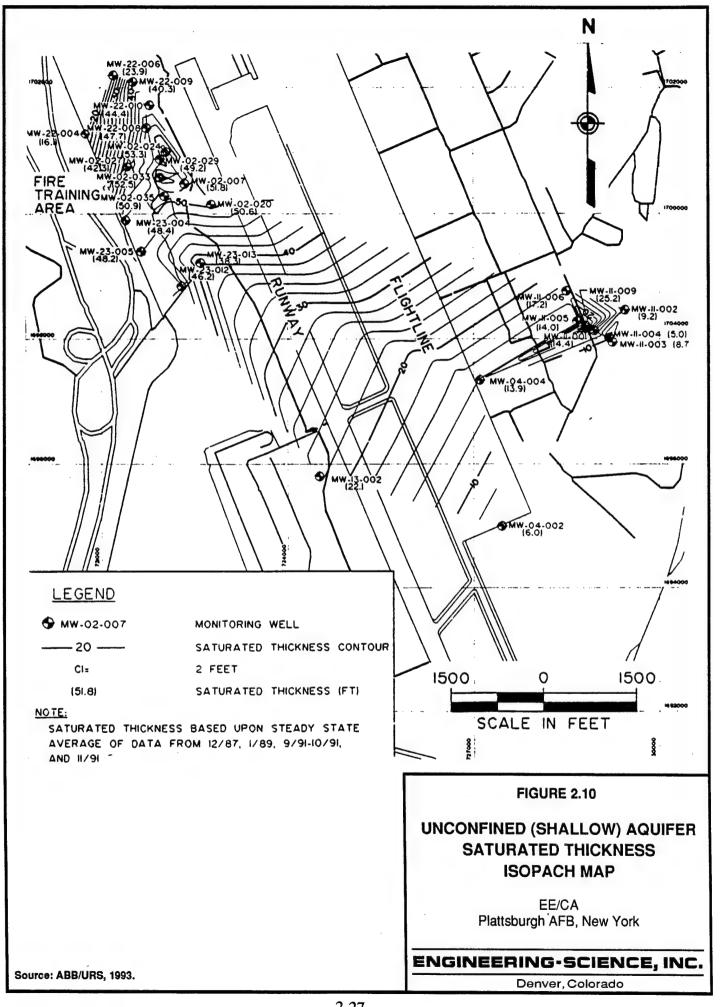
The Bioplume II® model is based upon the U.S. Geological Survey (USGS) twodimensional (2-D) solute transport model modified to include a biodegradation component that is activated by a superimposed plume of dissolved oxygen (Rifai et al., 1988). Bioplume II® solves the USGS 2-D solute transport equation twice, once for hydrocarbon concentrations in the aquifer and once for a dissolved oxygen plume. The two plumes are then combined using superposition at every particle move to simulate the biological reaction between hydrocarbons and oxygen. The Bioplume II® model calculates changes in contaminant concentration due to biodegradation reactions by assuming an instantaneous reaction between the contaminant and dissolved oxygen. The instantaneous reaction decreases the concentration of the contaminant by an amount proportional to the available dissolved oxygen in the aquifer. The model calculation is based upon modified Monod kinetics to simulate the degradation of hydrocarbon compounds and assumes that the hydrocarbons are directly mineralized to carbon dioxide and water. Because the model does not account for increased degradation due to the production of cell mass and intermediate reaction products, the extent of biodegradation is underestimated (e.g., see Malone et al., 1993). Thus, the Bioplume II® model presents a very conservative estimate of the amount of biodegradation occurring in the subsurface. Actual biodegradation rates will be higher than predicted by the model, and transport distances will be overestimated.

2.3.4 Governing Physical Parameters

Groundwater flow for the FT-002 site was modeled using the USGS MODFLOW model as part of the phase II groundwater remedial investigation (ABB/URS, 1993). The modeled area covered about 6,200 acres and was bounded by the Saranac River, Lake Champlain, and other artificial, institutional boundaries. Although this model was shown to adequately simulate groundwater flow, the MODFLOW model must be coupled with a solute transport model to simulate contaminant transport and fate. A preliminary modeling effort using a solute transport code was completed for the draft groundwater operable unit feasibility study report (URS, 1993). This modeling effort only considered the potential effects of natural attenuation by analytically estimating dispersivities, groundwater seepage velocity, and a degradation constant for a target compound (i.e., 1,2-DCE). The purpose of the modeling activities proposed herein is to investigate the potential for natural attenuation of contaminants of concern within the subsurface environment at the FT-002 site using historical field data and additional data to be collected during this investigation. Intrinsic remediation hinges on the ability of the aguifer to retard migration of and/or eliminate contaminants of concern prior to completion of any receptor exposure pathway.

The governing physical parameters that will be incorporated into the Bioplume II® model will be based on existing site-specific stratigraphic and hydrogeological information. Based on available data, ES will model the FT-002 site as an unconfined sand and silty sand aquifer. Given the vertical extent of the chlorinated solvent and BTEX plumes and the lack of hydrologic connection to the lower aquifer units at the site, ES will only model the upper, unconfined aquifer. This approach is consistent with available data and the groundwater models described above.

The thin core contaminant plume suggests a fairly uniform sand aquifer with a low dispersivity and limited sorbing capacity. As demonstrated by site data (Tables 2.1 and 2.2), no noticeable trend exists in hydraulic conductivity as a function of depth. Thus, ES will model the upper, unconfined aquifer as a single layer accounting for variations in the hydraulic conductivity and thickness of the upper, unconfined aquifer within each grid cell to the extent practicable (Figure 2.10). An effective porosity of 0.35 will be used for the model, which is consistent with available data and the phase II remedial investigation results (ABB/URS, 1993).



The phase II remedial investigation MODFLOW model divided the FT-002 site into cell sizes ranging from 100x100 feet to 100x200 feet. The Bioplume II® model requires a constant cell size. ES recommends the use of cell sizes equal to or less than 180x230 feet to cover the areal extent of the total plume yet provide adequate resolution of the groundwater flow system at the site.

ES has used available site-specific hydrogeologic data and representative hydrogeologic cross-sections at the FT-002 site which show the two- and threedimensional relationships between hydrostratigraphic units (i.e., conductive units and aquitards), surface water bodies, and groundwater divides at the site. These crosssections also integrate groundwater potentiometric data to show the position of the potentiometric surface relative to lithostratigraphic units to allow definition of the groundwater flow system and identification of preferential contaminant transport pathways. Figure 2.11 depicts the location of two hydrogeologic cross sections. Figure 2.12 represents a northwest-southeast hydrogeologic cross section of the FT-002 site which is oriented roughly parallel to the direction of groundwater flow. section shows that the depth of the saturated zone increases from the northwest to southeast across the site. Figure 2.13 represents a north-south hydrogeologic cross section of the FT-002 site which is oriented roughly perpendicular to the direction of Figure 2.2 shows groundwater potentiometric information groundwater flow. potentially suitable for use in the proposed modeling efforts.

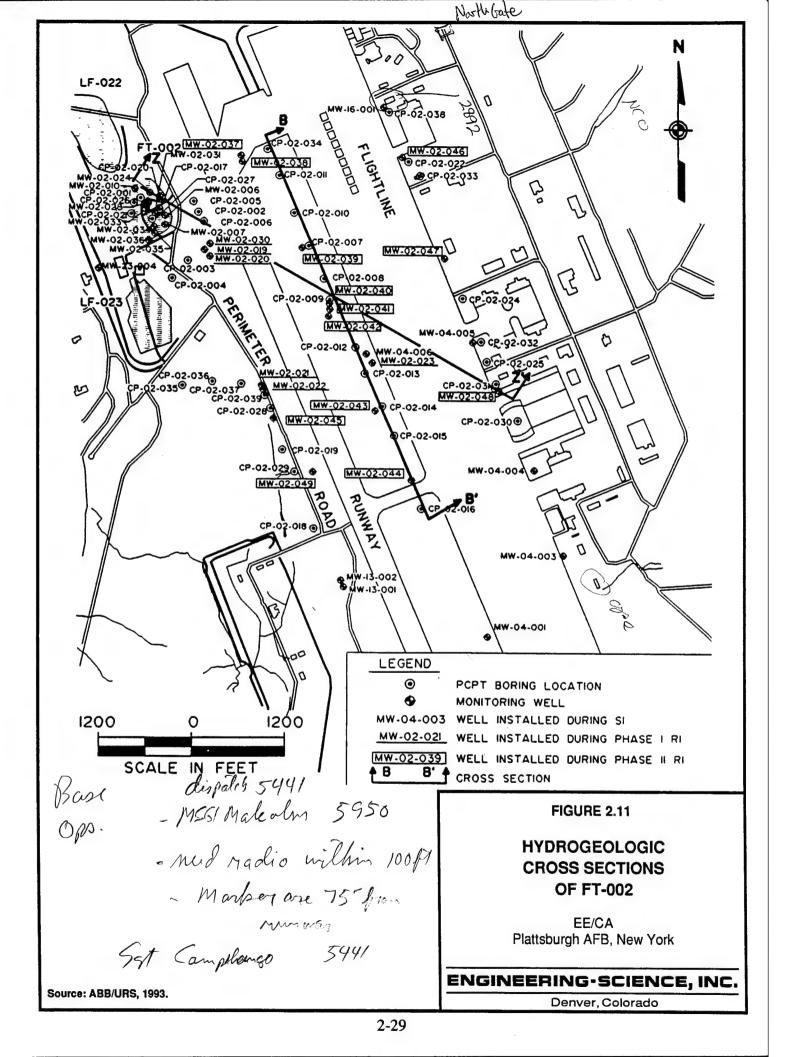
Based on the size of both the chlorinated solvent and BTEX plumes and the potential migration distance, a 20- by 30-cell model grid will be used. Each grid cell will have dimensions of 180 feet by 230 feet, based on existing site data. Figure 2.14 shows the proposed grid overlaid on the site map. The sizes of grid cells can be increased if preliminary runs of the Bioplume II® model indicate that the compounds of interest have the potential to migrate to and/or beyond model boundaries. Conversely, grid size can be reduced if greater resolution is desired and contaminant transport conditions allow.

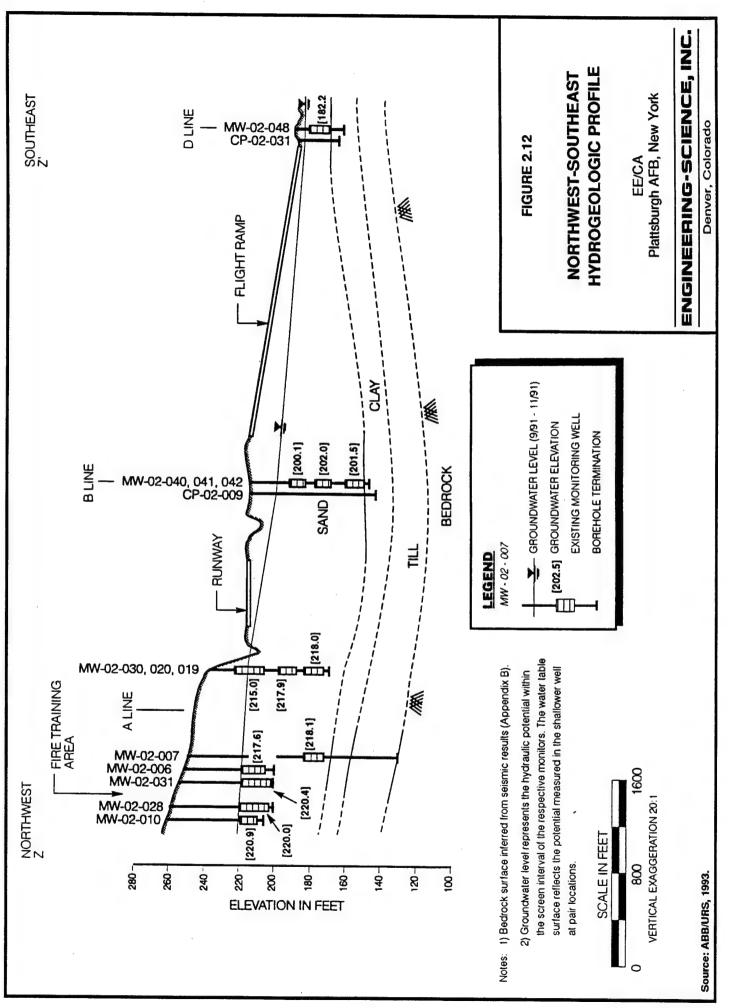
A summary site-specific conceptual model is schematically represented in Figure 2.15. This conceptual model may be modified as additional site hydrogeologic and other site-specific data become available.

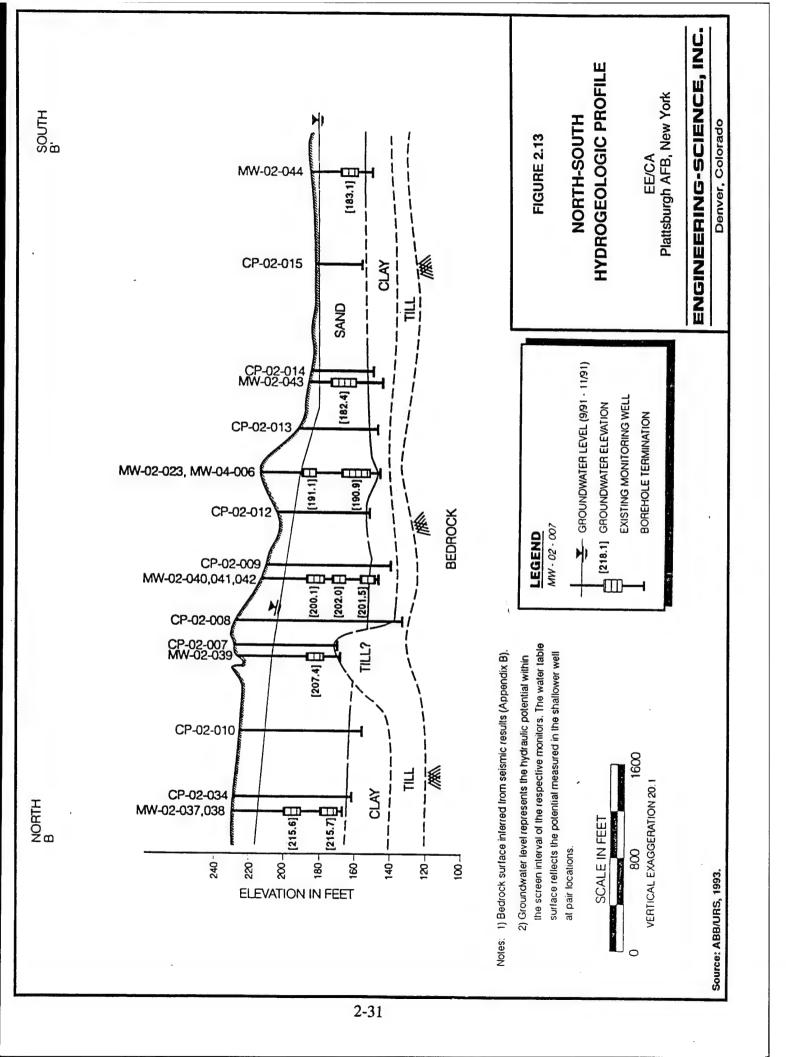
2.3.5 Governing Chemical Concerns

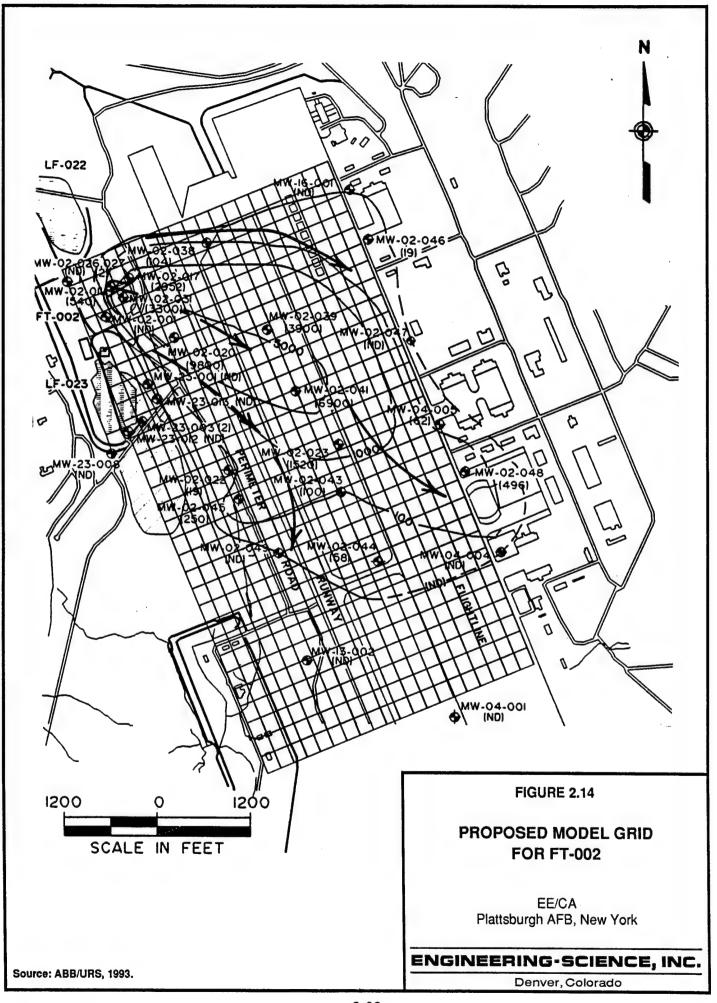
The primary contaminants of concern in the groundwater are the chlorinated solvent TCE and its degradation products cis- and trans-1,2-DCE; the volatile aromatic BTEX fuel components; fuel-related SVOCs naphthalene and 2-methylnapthalene; and nonchlorinated phenols. The secondary contaminants of concern include volatile chlorinated solvents (e.g., chloromethane, vinyl chloride, dichloroethane, etc.), ketones, chlorinated phenols, other industrial solvents, and inorganics. Detailed groundwater data on these contaminants are presented in Appendix B.

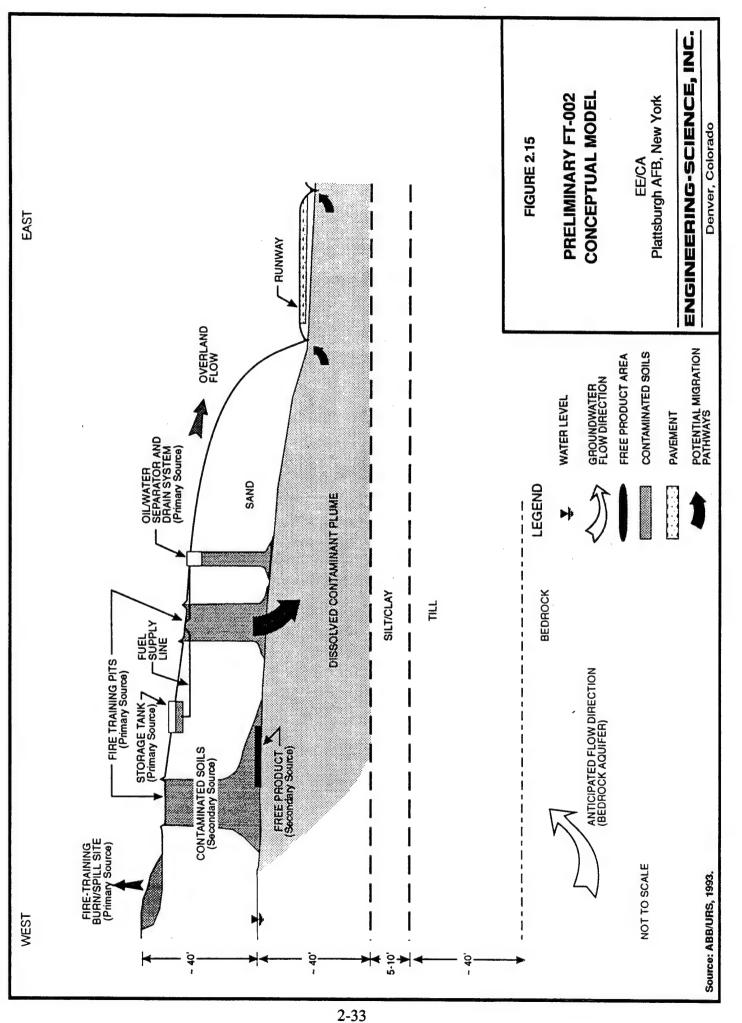
During installation and initial sampling of several groundwater monitoring wells, it was noted that the majority of TCE/DCE contamination was detected in free floating product or in soil near the groundwater table. The presence of DCE in the free product can be attributed to both onsite activities and/or the degradation of TCE. The presence of floating product and heavy soil contamination in the capillary fringe suggests that











oxygen transfer may be severely limited in the source area and that aerobic biological activity may not be occurring. However, installation and operation of the free product recovery and bioventing systems, which should be completed shortly, may enhance contaminant degradation via co-metabolic, aerobic biological processes. The degradation of TCE/DCE may be initiated or enhanced where there are higher concentrations of other degradable organic compounds (Howard, 1990). Site data suggest that biodegradation of TCE/DCE may be occurring both at the source and downgradient of the source where there are high concentrations of other degradable organic compounds. One of the goals of this study is to explore the possibility of cometabolism of chlorinated solvents and BTEX compounds in subsurface groundwater systems.

Migration of the TCE/DCE-containing free product is likely inhibited by the aquifer matrix. However, these contaminants could be more mobile than anticipated if they are partitioning from the free product into the groundwater. Because free product is present at the site, it may be necessary to use a contaminant/water partitioning model such as that developed by Bruce et al. (1991) to provide a conservative source term to model the partitioning of the individual or indicator chlorinated solvent compound(s) from the free-product phase into the groundwater. In order to use this model, samples of free product must be collected and analyzed for mass fraction of chlorinated solvent compounds. DCE is expected to be transported more quickly than TCE because of its greater water solubility. DCE has been detected at higher concentrations downgradient of the source area, which supports the possibility of contaminant dissolution and biodegradation.

The adsorption of the chlorinated solvent compounds of interest can be estimated using site-specific data to calculate an expected migration retardation coefficient. The degree of retardation of the chlorinated solvent plume will be calculated using the mass fraction of total organic carbon in the aquifer matrix and the octanol/water partitioning coefficient normalized for organic carbon of either the individual or selected indicator chlorinated solvent compound(s). This information will be incorporated into the model to simulate the behavior of the chlorinated solvents in a sandy aquifer.

The biodegradation of the fuel-related compounds of interest (BTEX) also appears to be inhibited within the FT-002 area. The degradation of BTEX compounds is inhibited by the surrounding anaerobic environment. Once these contaminants migrate away from the FT-002 source area and are exposed to more dissolved oxyen, biodegradation is likely occurring at a more rapid rate. This scenario is supported by existing site data, which show lower concentrations of these compounds in the peripheral plume. Chemical-specific calculations on the amount of dissolved oxygen necessary to mineralize a contaminant of interest will be developed using site-specific data and/or literature-derived information.

The migration of free product containing BTEX compounds is also likely inhibited by the aquifer materials. Again, these contaminants could be more mobile than anticipated if they are partitioning from the free product into the groundwater. Application of a fuel/water partitioning model such as that developed by Bruce et al. (1991) may be required to provide a conservative source term to model the partitioning of the BTEX compounds from the free-product phase into the groundwater. In order to

use this model, samples of free product must be collected and analyzed for mass fraction of BTEX compounds.

The adsorption of the various BTEX compounds may also be incorporated into the model through a retardation coefficient based on site-specific and literature-derived information. The adsorption of BTEX compounds to aquifer materials may serve to enhance potential biodegradation by allowing increased oxygen transfer through the sorbed plume over time.

2.3.6 Data Gaps

One of the most important parameters in defining potential biodegradation at a site is the concentration of dissolved oxygen in the aquifer. Because this information has not been previously reported, ES will conduct field sampling activities to define this parameter. Additionally, contaminant-specific isopleth maps have not been identified. ES will develop these maps using existing data; supplemental field measurements will be necessary to support the development of complete isopleth maps in support of the intrinsic remediation option evaluation activities. This information will be transferred to model grid cells by overlaying the isopleth map on the model grid. Available information on anaerobic decay for each of the contaminants may also be identified and incorporated into the model code.

2.3.7 Potential Exposure Pathways and Receptors

Potential preferential contaminant migration pathways such as surface discharge points and subsurface utility corridors (artificial conduits) will be identified during the field work phase of this project. Such information can be obtained from Plattsburgh AFB maps which delineate areas that may facilitate rapid subsurface transport and/or surface discharge. Pathways to potential receptors may include discharge of contaminated groundwater into downgradient surface water bodies (e.g., drainageway and surface stream), and migration of the contaminant plume toward downgradient potable and nonpotable water wells.

Potential human and/or ecological receptors of chlorinated solvent and BTEX contaminated groundwater will be identified. Although no designated wetland or ecological sensitive habitat has been identified within or adjacent to FT-002, the immediate area will be surveyed briefly to identify any potential ecological receptors. In addition, a survey of groundwater wells located downgradient of the dissolved-phase plume will be conducted. Because of the hydrologic connection between the groundwater plume and receiving surface water bodies, it may be necessary to survey the area outside the immediate FT-002 site.

SECTION 3

COLLECTION OF ADDITIONAL DATA

To accurately complete the EE/CA and to demonstrate that natural attenuation of site-related contaminants is occurring at Site FT-002, additional site-specific hydrogeologic data will be collected. The physical and chemical hydrogeologic parameters listed below will be determined during the field work phase of the EE/CA.

Hydrogeologic characteristics to be determined include:

- Depth from measurement datum to the groundwater surface.
- Depth from measurement datum to the base of the shallow saturated zone (where feasible).
- · Locations of potential groundwater recharge and discharge areas.
- · Locations of downgradient wells and their uses.
- Hydraulic conductivity through slug tests, as required.
- Estimate of dispersivity, where possible.
- Stratigraphic analysis of subsurface media.
- Determination of extent and thickness of free-phase product.

Chemical hydrogeologic characteristics to be determined include:

- · Dissolved oxygen concentration.
- · Temperature.
- Specific conductance.
- pH.
- Chemical analysis of free product to determine mass fraction BTEX.
- Additional chemical analysis of groundwater and soil for the parameters listed in Table 3.1.

In order to obtain these data, cone penetrometer testing (CPT), groundwater and product sampling, soil gas sampling, and soil sampling will be completed at Site FT-002 in support of the EE/CA. The following sections describe the procedures that will be followed when collecting additional site-specific data. Laser-Induced-Fluorescence (LIF), cone penetrometer, and soil gas sampling methods are described in Section 3.1. Procedures to be used to sample existing groundwater monitoring wells and collect

Table 3.1 Laboratory Analytical Protocol for Groundwater and Soil EE/CA Work Plan, Plattsburgh AFB

Matrix	Method	Volume Group	Field (F) or Analytical Laboratory (L)
Water			
Alkalinity (Carbonate [CO ₃ ²⁻] and Bicarbonate [HCO ₃ -])	E310.2	E	J
Aromatic hydrocarbons	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	2	1
Carbon dioxide (CO ₂)	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	ı	ı
Chloride	E300 or SW9056	9	1
Chlorinated compounds	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	2	L
Conductivity	E.120.1/SW9050	3	L
Ethane	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	4	J
Ethene	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	4	1
Ferrous Iron (Fe $^{2+}$)	Colorimetric	-	I L,

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Table 3.1 Laboratory Analytical Protocol for Groundwater and Soil EE/CA Work Plan, Plattsburgh AFB (continued)

Matrix	Method	Volume Group	Field (F) or Analytical Laboratory (L)
Methane	Gas chromatography - headspace SW8020-RSKERL-SOPL-122	4	1
Nitrate/nitrite	Colorimetric	9	J
Oxygen	HACH 16046 DO Meter	8	ΙΉ
Hd	E150.1/SW9040	5	Į L
Sulfate	Colorimetric	3	L
Temperature	Direct reading meter	5	ĮĮ.
Total fuel carbon	SW8020	2	1
Total organic carbon	SW8020	4	L
Soil			
BTEX	RSKERL-SOPL-72		
Chlorinated volatile organics			
Moisture	Dry @105°C		
Total petroleum hydrocarbons	Method 418.1		

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Table 3.1 Laboratory Analytical Protocol for Groundwater and Soil EE/CA Work Plan, Plattsburgh AFB (continued)

Matrix	Method	Volume Group	Field (F) or Analytical Laboratory (L)
Soil Gas			
Hydrocarbon vapor	Direct reading meters		
Carbon dioxide	Direct reading meters		
Methane	Direct reading meters		
Oxygen	Direct reading meters		
Footnotes:			
Volume Group			
1 = 50 m²			
2 = 80 ml			
3 = 240 ml			
4 = 120 mi			
5 = 200 mf			
$6 = 120 \mathrm{ml}$			

 $7 = 60 \, \text{ml}$

HydroPunch® samples are described in Section 3.2. Procedures to be used to collect soil core samples to verify LIF cone penetrometer and soil gas characterization data are described in Section 3.3.

3.1 CONE PENETROMETER AND SOIL GAS ANALYSIS

To further characterize the hydrogeologic conditions of the shallow subsurface at Site FT-002 for the intrinsic remediation demonstration, CPT will be completed. CPT will be conducted using the ARA penetrometer truck, which consists of an instrumented probe that is forced into the ground using a hydraulic load frame mounted on a heavy truck, with the weight of the truck providing the necessary reaction mass. The penetrometer equipment is mounted inside an 18-foot van body attached to a 10-wheel truck chassis with a turbo-charged diesel engine. Ballast in the form of metal weights and a steel water tank, which can hold 5,000 pounds of water, are added to the truck to achieve an overall push capability of 45,000 pounds. This push capacity may be limited in tight soils by the structural bending capacity of the 1.405-inch outside-diameter (OD) push rods, rather than by the weight of the truck. The current 45,000-pound limitation is intended to minimize the possibility of push-rod buckling. Penetration force is supplied by a pair of large hydraulic cylinders bolted to the truck frame.

The penetrometer probe is of standard dimensions, having a 1.405-inch-OD 60-degree conical tip, and a 1.405-inch-OD by 5.27-inch-long friction sleeve. Inside the probe, two load cells independently measure the vertical resistance against the conical tip and the side friction along the sleeve. Each load cell is a cylinder of uniform cross section inside the probe which is instrumented with four strain gauges in a full-bridge circuit. Forces are sensed by the load cells, and the data are transmitted from the probe assembly via a cable running through the push tubes. The analog data is digitized, recorded, and plotted by computer in the penetrometer truck.

The penetrometer is normally advanced vertically into the soil at a constant rate of 48 inches per minute, although this rate must sometimes be reduced, such as when hard layers are encountered. The focus of the cone penetrometer sampling at Site FT-002 is to delineate the free-phase and dissolved-phase BTEX plumes. The magnitude of the penetration pore pressure is a function of compressibility and, most importantly, permeability. Penetration, dissipation, and resistivity data will be used to determine potential site layering as it is encountered in the field.

A LIF CPT system will be employed to characterize the areal extent of the free-phase plume at Site FT-002. The LIF CPT probe is designed to measure tip and sleeve stress, pore pressure, and LIF simultaneously. The fiber optic cable connected to the laser spectrometer, and a 6-pair electrical conductor connected to the CPT data acquisition system, are routed through the interior of the push tubes to the CPT probe. Two load cells measure vertical resistance beneath the tip and frictional resistance on the side of the probe, respectively. The pressure gauge located above the cone tip monitors the pore water pressure.

The basic laser system components of the LIF CPT are a Nd:YAG® pump laser, two separate and independent dye lasers, frequency-doubling crystals to convert the visible

dye laser output to ultraviolet, a fiber optic probe, a monochromator for wavelength resolution of the return fluorescence, a photomultiplier tube to convert photons into an electrical signal, a digital oscilloscope for waveform capture, and a control computer. The fiber optic probe for the cone penetrometer consists of a delivery and collection fiber, a protective sheath, a fiber optic mount within the cone, and a sapphire window. The up-hole portion of the system is adaptable to either groundwater monitoring fiber optic probes or an optical cone penetrometer probe. Optimal wavelengths to be used during a continuous CPT push will be determined from initial data. Wavelength is selected to give the strongest fluorescence signal, which can be attributed to the presence of contamination. Past experience suggests that a short wavelength of less than 275 nanometers (nm) may be appropriate for the fluorescence of BTEX.

In addition to LIF CPT data, soil gas sampling data will also be collected at 10-foot intervals at locations near each LIF CPT push. The following sections outline the overall sampling strategy to be completed in support of the intrinsic remediation EE/CA.

3.1.1 Sampling Strategy

LIF CPT data will be coupled with soil gas analysis to define the areal and vertical extent of the free-phase plume at Site FT-002. The cone penetrometer will be pushed from ground surface to approximately 10 feet below the groundwater level at any specific sample point. Soil gas samples will also be taken at 10-foot intervals, and will be analyzed for carbon dioxide, oxygen, total petroleum hydrocarbons (TPH), and methane. Feed lines for soil gas analyses will be attached directly to gas analytical instrumentation housed in the penetrometer truck.

It is anticipated that 12 to 16 LIF CPT points will be sampled to define the edges of the free-phase plume. The general area to be sampled was determined during the October 18 and 19, 1993 meetings at Plattsburgh AFB. Sample locations will be along the suspected plume centerline, in an iterative, forward and backward fashion to define the leading edge of the free-phase plume. Once the downgradient edge of the free-phase plume has been identified, additional cone penetrometer sample points will define the lateral edges. Initial cone penetrometer samples will be taken in the vicinity of previous CPT boring locations CP-02-020 and CP-02-027 (see Appendix B). Soil gas sample locations will be immediately adjacent to LIF CPT sample points.

3.1.2 CPT Hole Grouting Procedure

Cone penetrometer testing can create holes which may provide potential contamination pathways into groundwater supplies. To prevent any cross contamination, the test holes will be grouted to seal the hole and eliminate the contaminant migration pathway. The instrumented cone assembly and any other retrievable portion of the assembly will be completely removed from the penetration hole. Grout will be prepared using bentonite pellets.

All necessary digging permits will be obtained prior to mobilizing to the field. In addition, all utility lines will be located and proposed CPT locations cleared prior to any CPT pushing activities.

3.1.3 Decontamination Procedures

The CPT push rods will be cleaned with ARA's CPT steam-cleaning system (rod-cleaner) as the rods are withdrawn from the ground. A vacuum system has been developed, which results in nearly 100-percent recovery of steam-cleaning rinseate from the rod-cleaner located beneath the CPT truck. Rinseate is generated only as the rods move past the cleaner, thereby minimizing liquid waste generation. Care will be taken not to apply the pressurized steam to the LIF module. Rinseate does not have to be collected for disposal, per Plattsburgh AFB.

Potable water to be used in CPT equipment cleaning, decontamination, or grouting will be obtained from one of the base's onsite water supplies. Water use approval will be verified by contacting the appropriate facility personnel. Only potable water will be used for the activities listed above. The field hydrogeologist will make the final determination as to the suitability of site water for these activities. Precautions will be taken to minimize any impact to the surrounding area that might result from decontamination operations. Fuel, lubricants, and other similar substances will be handled in a manner consistent with accepted safety procedures and standard operating practices.

3.2 GROUNDWATER SAMPLING

This section describes the scope of work required for collecting groundwater quality samples at the existing groundwater monitoring wells and near existing LIF CPT locations using the HydroPunch® sampling apparatus. All water samples collected from groundwater monitoring wells will be obtained using dedicated, disposable bailers. In order to maintain a high degree of quality control during this sampling event, the procedures described in the following sections will be followed.

Groundwater sampling will be conducted by qualified scientists and technicians trained in the conduct of well sampling, records documentation, and chain-of-custody procedures. In addition, sampling personnel will have thoroughly reviewed this plan prior to sample acquisition and will have a copy of the plan available onsite for reference.

For this project, groundwater samples will be collected in two phases. Phase one will consist of collecting groundwater samples near LIF CPT locations using the HydroPunch[®]. This phase of the groundwater sampling process is described in Section 3.2.3.1 and will occur during December 3 and 6, 1993. The second phase of groundwater sampling is described in Section 3.2.3.2 and will occur during December 3 through 6, 1993.

Activities that will occur during groundwater sampling are summarized below:

- Assembly and preparation of equipment and supplies;
- Inspection of the well integrity (for monitoring well sampling), including
 - Protective cover, cap, and lock,
 - External surface seal and pad,
 - Well stick-up, cap, and datum reference,

- Internal surface seal, and
- Condition of bladder pump if present;
- · Groundwater sampling, including
 - Water level measurements,
 - Visual inspection of borehole water,
 - Well casing evacuation, and
 - Sampling;
- Sample preservation and shipment, including
 - Sample preparation,
 - Onsite measurement of physical parameters, and
 - Sample labeling;
- · Completion of sampling records;
- · Completion of chain-of-custody records; and
- Sample disposition.

Detailed groundwater sampling and sample handling procedures are presented in following sections.

3.2.1 Groundwater Sampling Strategy

Groundwater samples will be collected from existing monitoring wells using a disposable bailer and near CPT locations using HydroPunch® groundwater sampling equipment.

3.2.1.1 HydroPunch® Sampling

The HydroPunch II® sampling device is designed to be pushed or driven to the desired sample depth, either from the ground surface or from the bottom of a drilled borehole, similar to a split-barrel sampler. The HydroPunch® utilizes an air-tight and water-tight sealed intake screen and sample chamber, which is isolated from the surrounding environment as the tool is advanced. The surface of the HydroPunch® is designed to prevent the downward transport of contamination as the tool is advanced; it cleans itself as the soil particles are displaced to the side. The tight seal which is created as the soil is displaced and compacted allows the collection of a discrete sample from a specific depth.

The HydroPunch® can be used to sample both groundwater and floating free product. Groundwater samples will be collected from the groundwater table to 45 feet below the groundwater table at 5-foot intervals at six locations using the HydroPunch® sampling apparatus. These six HydroPunch® samples will be taken in an upgradient (background) area (two samples), within the defined free-phase plume (two samples), and in the area immediately adjacent to the free-phase plume on the downgradient side (two samples). HydroPunch® provides 1.2 liters of sample volume, which should be sufficient for the water quality analyses detailed in Table 3.1. Should the sample

volume prove to be insufficient, the analytical protocol will be modified based on sample yield at each depth interval. Three additional HydroPunch® groundwater samples will be collected from the dissolved-phase plume located downgradient of the free-phase source area. These samples will be collected near the groundwater table (from 5 feet or more below the water table surface) and will be analyzed according to the analytical protocol listed in Table 3.1. These additional samples are necessary to help define the extent of the dissolved-phase BTEX plume and to allow the calculation of the anaerobic decay constant. These data will also aid in calibration of the Bioplume II® model for the site.

3.2.1.2 Existing Monitoring Well Sampling

Existing groundwater monitoring wells both upgradient and downgradient of the free-phase plume and the dissolved-phase plume will also be sampled. The following 12 wells will be sampled to facilitate Bioplume II® model calibration: MW-02-026 and MW-02-027 (background); MW-02-007 and MW-02-013 (within free-phase plume); MW-02-019, MW-02-020, and MW-02-030 (downgradient of free-phase plume); and MW-02-021, MW-02-040, MW-02-041, MW-02-042, and MW-02-043 (downgradient of the dissolved-phase plume).

3.2.2 Preparation for Sampling

All equipment to be used for sampling will be assembled and properly cleaned and calibrated (if required) prior to arriving in the field. In addition, all record-keeping materials will be gathered prior to leaving the office.

3.2.2.1 Equipment Cleaning

All portions of sampling and test equipment that will contact the sample matrix will be thoroughly cleaned before use. This includes the HydroPunch® tool, water-level probe and cable, lifting line, test equipment for onsite use, and other equipment or portions thereof which will contact the samples. Based on the types of sample analyses to be conducted, the following cleaning protocol will be used:

- Clean with potable water and phosphate-free laboratory detergent (HP-II detergent solutions, as appropriate);
- Rinse with potable water;
- · Rinse with distilled or deionized water;
- Rinse with reagent-grade methanol;
- Air dry the equipment prior to use.

Any deviations from these procedures will be documented in the field scientist's field notebook and on the groundwater sampling form.

If pre-cleaned dedicated sampling equipment is used, the cleaning protocol specified above will not be required. The EPA laboratory-supplied sample containers will be cleaned and sealed by the laboratory and therefore will not need to be cleaned in the field. The type of container provided and the method of container decontamination will be documented in the EPA's permanent record of the sampling event.

3.2.2.2 Equipment Calibration

As required, field analytical equipment will be calibrated according to the manufacturer's specifications prior to field use. This applies to equipment used for onsite measurements of pH, electrical conductivity, and temperature.

3.2.3 Sampling Procedures

Special care will be taken to prevent contamination of the groundwater and extracted samples. The two primary ways in which sample contamination can occur are through contact with improperly cleaned equipment and by cross-contamination through insufficient cleaning of equipment between wells. To prevent such contamination, the water level probe and cable used to determine static water levels and well total depths will be thoroughly cleaned before and after field use and between uses at different sampling locations according to the procedures presented in Section 3.2.2.1. In addition to the use of properly cleaned equipment, a clean pair of new, disposable nitrile gloves will be worn each time a different well is sampled.

The following paragraphs present the procedures to be followed for groundwater sample collection from the HydroPunch® and groundwater monitoring wells. These activities will be performed in the order presented below. Exceptions to this procedure will be noted in the field scientist's field notebook.

3.2.3.1 HydroPunch® Groundwater Sampling

3.2.3.1.1 Sampling Interval and Method

The sampling depth and interval will be specified prior to driving the HydroPunch® into the ground. The ES field hydrogeologist will verify the sampling depth by measuring the length of each HydroPunch® sampling rod prior to insertion into the ground. After insertion, the drive rods or hammer will be pulled back to pull the cone out of the body of the HydroPunch® device, permitting groundwater to enter. A minimum of 6 inches of the body of the device must be in the driven hole to provide a good annular seal.

3.2.3.1.2 Preparation of Location

Prior to starting the sampling procedure, the area around the hole will be cleared of foreign materials, such as brush, rocks, and debris. This will prevent sampling equipment from inadvertently contacting foreign materials near the sampling point.

3.2.3.1.3 Water Level and Total Depth Measurements

Prior to removing any water from the HydroPunch® sampling device, the static water will be measured. A manometer with hollow high-density polyethylene (HDPE) tubing will be inserted into the hollow HydroPunch® device through which the groundwater sample will be acquired until the manometer indicates that groundwater has been reached. The HDPE to be attached to the manometer will then be marked at the level of the ground surface and removed from the ground. The depth to water will be determined by placing a tape measure next to the HDPE tubing and measuring the length from the base of the tubing to the ground level mark to the nearest 0.1 foot. The sampling depth will be measured to the nearest 0.1 foot by noting the depth to which the HydroPunch® tool was driven.

3.2.3.1.4 Sample Extraction

Allowing for adequate fill time, the HydroPunch® sampling device will be pulled to the surface, unthreaded from the upper subassembly, and replaced with the thread retainer. The sample will be transferred directly into the analyte-appropriate sample container. The water will be carefully poured down the inner walls of the sample bottle to minimize aeration of the sample.

Unless other instructions are given by the analytical laboratory, sample containers will be completely filled so that no air space remains in the container. Excess water collected during sampling does not require special handling, per Plattsburgh AFB.

3.2.3.2 Groundwater Monitoring Well Sampling

3.2.3.2.1 Preparation of Location

Prior to starting the sampling procedure, the area around the existing well will be cleared of foreign materials, such as brush, rocks, and debris. These procedures will prevent sampling equipment from inadvertently contacting debris around the monitoring well.

3.2.3.2.2 Water Level and Total Depth Measurements

Prior to removing any water from the existing well, the static water level will be measured. An electrical water level probe will be used to measure the depth to groundwater below the datum to the nearest 0.01 foot. After measuring the static water level, the water level probe will be slowly lowered to the bottom of the well and the total well depth will be measured to the nearest 0.01 foot. Based on these measurements, the volume of water to be purged from the well will be calculated. If free-phase product is encountered, attempts will be made to sample both within and below the oil lens.

3.2.3.2.3 Well Purging

The volume of water contained within the well casing at the time of sampling will be calculated, and three times the calculated volume will be removed from the well. All purge water will be placed in 55-gallon drums and disposed of according to Plattsburgh AFB procedures, as appropriate. The empty drums will be rinsed with hot water and returned to base personnel for reuse. Dedicated disposable bailers will be used for well purging.

If a well is evacuated to a dry state during purging, the well will be allowed to recharge, and the sample will be collected as soon as sufficient water is present in the well to obtain the necessary sample quantity. Sample compositing, or sampling over a lengthy period by accumulating small volumes of water at different times to obtain a sample of sufficient volume, will not be allowed.

3.2.3.2.4 Sample Extraction

Dedicated, disposable, polyethylene bailers will be used to extract groundwater samples from the well. The bailer will be lowered into the water gently to prevent splashing and extracted gently to prevent creation of an excessive vacuum in the well. The sample will be transferred directly into the appropriate sample container. The

water sample will be transferred from the bailer by discharging the sample from the bottom. The water will be carefully poured down the inner walls of the sample bottle to minimize aeration of the sample.

Unless other instructions are given by the analytical laboratory, sample containers will be completely filled so that no air space remains in the container. Excess water collected during sampling will be placed into the 55-gallon drums used for well purge waters and disposed of according to Plattsburgh AFB procedures, as appropriate.

3.2.4 Onsite Groundwater Parameter Measurement

The following sections describe the procedures to be used to analyze groundwater samples from both the HydroPunch® and existing groundwater monitoring wells at Site FT-002.

3.2.4.1 Dissolved Oxygen Measurements

Except where the USEPA can obtain dissolved oxygen (DO) measurements from collected groundwater samples, DO measurements will be taken using a meter with a downhole oxygen sensor. DO measurements will be taken immediately following groundwater sample acquisition. When DO measurements will be taken in HydroPunch® holes or wells that have not yet been sampled, the HydroPunch® hole or existing well will be purged as described in Section 3.2.3.2.3 prior to taking the DO measurement.

3.2.4.2 pH, Temperature, and Specific Conductance

Because the pH, temperature, and specific conductance of a groundwater sample can change significantly within a short time following sample acquisition, these parameters will be measured in the field in unfiltered, unpreserved, "fresh" water collected by the same technique as the samples taken for laboratory analyses. The measurements will be made in a clean glass container separate from those intended for laboratory analysis, and the measured values will be recorded in the groundwater sampling record.

3.2.5 Sample Handling

This section describes the handling of samples from the time of sampling until the samples arrive at the laboratory.

3.2.5.1 Sample Preservation

The USEPA analytical support personnel will add any necessary chemical preservatives prior to shipping the containers to the site. Samples will be properly prepared for transportation to the USEPA laboratory by placing the samples in a cooler containing ice to maintain a shipping temperature of 4 degrees centigrade (°C).

3.2.5.2 Sample Container and Labels

Sample containers and appropriate container lids will be provided by the USEPA. The sample containers will be filled as described in Sections 3.2.3.1.4 and 3.2.3.2.4 and the container lids will be tightly closed. The sample label will be firmly attached to the container side, and the following information will be legibly and indelibly written on the label:

- · Facility name;
- Sample identification;
- Sample type (e.g., groundwater);
- · Sampling date;
- · Sampling time;
- · Preservatives added; and
- Sample collector's initials.

3.2.5.3 Sample Shipment

After the samples are sealed and labeled, they will be packaged for transport to the USEPA laboratory. The following packaging and labeling procedures will be followed:

- Package sample so that it will not leak, spill, or vaporize from its container; and
- Label container with
 - Sample collector's name, address, and telephone number;
 - Laboratory's name, address, and telephone number;
 - Description of sample;
 - Quantity of sample; and
 - Date of shipment.

The packaged samples will be delivered by ES or ARA personnel to the USEPA laboratory. Delivery will occur shortly after sample acquisition.

3.2.5.4 Chain-of-Custody Control

After the samples have been collected, chain-of-custody procedures will be followed to establish a written record of sample handling and movement between the sampling site and the USEPA laboratory. Each shipping container will have a chain-of-custody form completed in triplicate by the sampling personnel. One copy of this form will be kept by the sampling contractor after sample delivery to the analytical laboratory, and the other two copies will be retained at the laboratory. One of the laboratory copies will become a part of the permanent record for the sample and will be returned with the sample analytical results. The chain-of-custody will contain the following information:

- Sample identification number;
- Sample collector's printed name and signature;
- Date and time of collection:
- Place and address of collection:
- Sample matrix;
- Chemical preservatives added;

- · Analyses requested;
- Signatures of individuals involved in the chain of possession; and
- Inclusive dates of possession.

The chain-of-custody documentation will be placed inside the shipping container so that it will be immediately apparent to the laboratory personnel receiving the container, but will not be damaged or lost during transport. The shipping container will be sealed so that it will be obvious if the seal has been tampered with or broken.

3.2.5.5 Sampling Records

In order to provide complete documentation of the sampling event, detailed records will be maintained by the field hydrogeologist. At a minimum, these records will include the following information:

- Sample location (facility name);
- Sample identification;
- Sample location map or detailed sketch;
- Date and time of sampling;
- · Sampling method;
- · Field observations of
 - Sample appearance,
 - Sample odor,
- Weather conditions;
- Water level prior to purging;
- · Total well depth;
- Purge volume;
- Water level after purging;
- Well condition;
- Sampler's identification;
- · Field measurements of pH, temperature, DO, and specific conductivity; and
- Any other relevant information.

Groundwater sampling information will be recorded on a groundwater sampling form. Figure 3.1 at the end of this section shows an example of the groundwater sampling record.

3.2.6 Laboratory Analyses

Laboratory analyses will be performed on all groundwater samples and the QA/QC samples described in Section 5. The analytical methods for this sampling event are listed in Table 3.1. Prior to sampling, arrangements will be made with USEPA

analytical support personnel who will be on site during field activities to provide a sufficient number of appropriate sample containers for the samples to be collected. All containers, preservatives, and shipping requirements will be consistent with USEPA protocol or those reported in Appendix A of this plan.

USEPA analytical support personnel will specify the necessary QC samples and notify the laboratory to prepare appropriate QC sample bottles. For samples requiring chemical preservation, preservatives will be added to containers by the laboratory prior to transportation. Containers, ice chests with adequate padding, and cooling media may be sent by the laboratory to the site. Sampling personnel will fill the sample containers and return the samples to the laboratory.

3.3 SOIL CORE SAMPLING AND ANALYSIS

The third stage of field work to be completed at Site FT-002 will involve coring the suspected area of the free-phase plume from approximately 4 feet above the free-phase to approximately 4 feet below the free-phase to verify/validate the CPT and soil gas data. These soil cores will be located near the CPT/soil gas sampling locations to allow data comparison and verification. ARA will provide the equipment and personnel necessary to complete this activity during the period of December 7 through 10, 1993. Fifty-foot resolution of soil cores for verification purposes will be considered sufficient for the intrinsic remediation demonstration for Site FT-002.

A Gouda Soil Sampler® may be employed at the site to collect "undisturbed" soil samples at any desired depth within the range of the driving apparatus (see Section 3.1). The sampler penetrates the soil, while the Gouda Soil Sampler® cone is in position, and prevents soil substances from entering the sampling tube. When the sampler has been pushed to the depth at which the soil sample is to be taken, the section of the sampler tubing extending above the ground is withdrawn approximately 26 centimeters (cm), thus blocking the cone in the upper position. The sampler is then pushed into the soil approximately 24 cm, and pulled up to the ground surface as quickly as possible.

A Mostap-35® device may also be used to collect soil samples. The Mostap apparatus is pushed to the preferred depth, and then unlocked to cut a complete soil sample. The sampling apparatus is then withdrawn.

If the sampling techniques described above are not appropriate for the characterization of Site FT-002, continuous soil samples will be obtained using a CME® split-barrel, continuous sampling device or another similar method judged acceptable by the ES field hydrogeologist. Soil samples will be collected continuously over the full depth of the soil borehole unless an alternative sampling frequency is requested by the ES field hydrogeologist. Procedures will be modified, if necessary, to ensure good sample recovery. The soil samples collected will be removed from the continuous sampler and placed on clean aluminum foil for logging.

A portion of each soil sample will be placed in a clean glass jar for photoionization detector (PID) headspace measurements for VOCs. Representative portions of the soil samples collected for the headspace procedure will be quickly transferred to clean glass jars, sealed with aluminum foil, and held for 15 minutes at an ambient temperature.

Measurements will be made by puncturing the aluminum foil seal with the PID probe and reading the concentration of the headspace gases. The PID relates the concentration of total VOCs in the sample to an isobutylene calibration standard. It is anticipated that headspace measurements will be performed on all samples collected. The PID will also be used to monitor the worker breathing zone.

The ES field hydrogeologist will be responsible for observing all field investigation activities, maintaining a detailed descriptive log of all subsurface materials recovered, photographing representative samples, and properly labeling and storing samples. An example of the proposed geologic boring log form is presented in Figure 3.2 at the end of this section. The descriptive log may contain:

- Sample interval (top and bottom depth);
- Sample recovery;
- Presence or absence of contamination;
- Lithologic description, including relative density, color, major textural constituents, minor constituents, porosity, relative moisture content, plasticity of fines, cohesiveness, grain size, structure or stratification, relative permeability, and any other significant observations; and
- Depths of lithologic contacts and/or significant textural changes will be measured and recorded to the nearest 0.1 foot.

The purpose of the soil corings is to verify/validate the LIF CPT and soil gas data. Site hydrogeologic characterization of Site FT-002 already has been accomplished.

Although soil cuttings should be very minimal, soil cuttings exhibiting petroleum hydrocarbon or solvent contamination based on PID screening will be drummed and stored onsite during the sampling operations. Any drummed material will be transferred to Plattsburgh AFB for disposition, as necessary.

3.3.1 Borings Location and Datum Survey

The location of and other relevant site information for the soil corings taken for verification purposes will be recovered by the ES field hydrogeologist. The horizontal location will be measured relative to established Plattsburgh AFB coordinates. Horizontal coordinates will be measured to the nearest 0.01 foot. Vertical location of the ground surface relative to the measurement datum will also be measured relative to USGS mean sea level data. The ground surface elevation will be measured to the nearest 0.1 foot, and the measurement datum will be measured to the nearest 0.01 foot.

3.3.2 Site Restoration

After sampling is complete, each soil coring site will be restored as close to its original condition as possible. Although soil cuttings should be very minimal, any clean soil cuttings brought to the surface will be placed in 55-gallon drums for disposition by Plattsburgh AFB personnel, as necessary.

Figure 3.1 Groundwater Sampling Log

	SAMPLING LOCATIONSAMPLING DATE(S)
GROUNE	WATER SAMPLING RECORD - MONITORING WELL
	(number)
REASON DATE AN SAMPLE	FOR SAMPLING: [] Regular Sampling; [] Special Sampling; [] TIME OF SAMPLING:, 19a.m./p.m. COLLECTED BY: of
WEATHE	ER:
DATUM I	FOR WATER DEPTH MEASUREMENT (Describe):
MONITO	RING WELL CONDITION:
	[] LOCKED: [] UNLOCKED
	WELL NUMBER (IS - IS NOT) APPARENT
	STEEL CASING CONDITION IS:
	INNER PVC CASING CONDITION IS:
	WATER DEPTH MEASUREMENT DATUM (IS - IS NOT) APPARENT
	[] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe):
	[] MONTORING WELL REQUIRED RELAIR (describe)
Check-off	
1[]	
	Items Cleaned (List):
2[]	WATER DEPTHFT. BELOW DATUM
	Measured with:
3[]	WATER-CONDITION BEFORE WELL EVACUATION (Describe):
	Appearance:
	Odor:Other Comments:
4[]	WELL EVACUATION:
	Method:
	Volume Removed:
	Observations: Water (slightly - very) cloudy
	Water level (rose - fell - no change)
	Water odors:
	Other comments:

5[]	SAMPLE	EXTRACTIO	ON METHOD:	
		[] Pump, typ	pe:	
		Sample obtain	ned is [] GRA	B; [] COMPOSITE SAMPLE
6[]	ON-SITE	pH:Conductivity:		Measured with: Measured with: Measured with:
7[]	SAMPLE	CONTAINE	RS (material, nur	nber, size):
8[]	ON-SITE	SAMPLE TR	REATMENT:	
	[]	Filtration:	Method	Containers: Containers: Containers:
	[]	Preservatives	added:	
			Method	Containers: Containers: Containers: Containers:
9[]	CONTAI	NER HANDI	ING:	
		[] Contain	er Sides Labeled er Lids Taped ers Placed in Ice	Chest
10[]	OTHER	COMMENTS	:	

Ground Water Sampling Record - Monitoring Well No. _____ (Cont'd)

						E	30	RE	HOLE	: L	OG								
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SECTION 4

REMEDIAL OPTION EVALUATION AND EE/CA REPORT

Upon completion of field work, the Bioplume II® numerical groundwater model will be used to determine the fate and transport of fuel hydrocarbons and chlorinated solvents dissolved in groundwater at the site. Based upon model predictions of contaminant concentration and distribution through time, and upon potential exposure pathways, the potential risk to human health and the environment will be assessed. If it is shown that natural attenuation of BTEX compounds and/or chlorinated solvents is sufficient to reduce the potential risk to human health and the environment to acceptable levels, ES will recommend implementation of the natural attenuation coupled with long-term monitoring remedial option. If natural attenuation is chosen, ES will prepare a site-specific, long-term monitoring plan which will specify the location of point-of-compliance monitoring wells and sampling frequencies.

If the natural attenuation remedial option is deemed inappropriate for use at this site, institutional controls such as groundwater or land use restrictions will be evaluated to determine if they will be sufficient to reduce the risk to human health and the environment to acceptable levels. If institutional controls are inappropriate, remedial options which could reduce risks to acceptable levels will be evaluated and the most appropriate remedial options recommended. Potential remedial options include, but are not limited to, free-product recovery, groundwater pump-and-treat, enhanced biological treatment, bioventing, air sparging, and *in situ* reactive barrier walls. The reduction in dissolved BTEX that should result from remedial activities will be used to produce a new input file for the Bioplume II® model. The model will then be used to predict the BTEX plume (and risk) reduction that should result from remedial actions

Upon completion of Bioplume II® modeling and remedial option selection, a report detailing the results of the modeling and remedial option selection will be prepared. This report will follow the outline presented in Figure 4.1 and will contain an introduction, site description, identification of remediation objectives, description of remediation alternatives, an analysis of remediation alternatives, and the recommended remedial approach. This report will also contain the results of the site characterization activities described herein and a description of the Bioplume II® model developed for this site.

FIGURE 4.1

EXAMPLE EE/CA REPORT OUTLINE

INTRODUCTION

SITE DESCRIPTION

Background Soil and Groundwater Characteristics Site Contamination

IDENTIFICATION OF REMEDIATION OBJECTIVES

Potential Pathways for Human/Ecological Contact Chemical-Specific Applicable or Relevant and Appropriate Requirements (ARARs.)

DESCRIPTION OF REMEDIATION ALTERNATIVES

Natural Attenuation/Long-Term Monitoring Alternative 2 (Site Specific) Alternative 3 (Site Specific)

ANALYSIS OF REMEDIATION ALTERNATIVES

Protectiveness (BioPlume® Model Results & Discussion) **Implementability**

- Technical
- Administrative (Political)

Cost

- Capital Costs
- Operating Costs Present Worth Cost

RECOMMENDED REMEDIATION APPROACH

How does the recommended technology offer adequate protection for less cost.

APPENDIX A: Supporting Data and Documentation

APPENDIX B: Site Specific BioPlume II® Model Input and Results

SECTION 5

QUALITY ASSURANCE/QUALITY CONTROL

Field QA/QC procedures will include collection of field duplicates and rinseate, field and trip blanks; decontamination of the water level probe and cable; use of analyte appropriate containers; and chain-of-custody procedures for sample handling and tracking. All samples to be transferred to the USEPA for analysis will be clearly labeled to indicate sample number, location, matrix (e.g., groundwater), and analyses requested. Samples will be preserved in accordance with the analytical methods to be used, and water sample containers will be packaged in coolers with ice to maintain a temperature of 4 °C.

All field sampling activities will be recorded in a bound, sequentially paginated field notebook in permanent ink. All sample collection entries will include the date, time, sample locations and numbers, notations of field observations, and the sampler's name and signature. Field QC samples will be collected in accordance with the program described below, and as summarized in Table 5.1.

QA/QC sampling will include collection and analysis of duplicate samples, rinseate blanks, field/trip blanks, and matrix spike samples. Internal laboratory QC analyses will involve laboratory control samples (LCSs) and laboratory method blanks (LMBs). QA/QC objectives for each of these samples, blanks, and spikes are described below.

HydroPunch® groundwater samples should provide sufficient volume for some duplicate analysis. Refer to Table 3.1 for further details on volume requirements.

One rinseate sample will be collected for every 10 or less groundwater samples collected from existing wells. Because disposable bailers may be used for this sampling event, the rinseate sample will consist of a sample of distilled water poured into a bailer and subsequently transferred into a sample container provided by the laboratory. Rinseate samples will be analyzed for VOCs only.

A field blank will be collected for every 20 or less groundwater samples (both from HydroPunch® and existing well sampling events) to assess the effects of ambient conditions in the field. The field blank will consist of a sample of distilled water poured into a laboratory-supplied sample container while sampling activities are underway. The field blank will be analyzed for VOCs.

A trip blank will be analyzed to assess the effects of ambient conditions and conditions on sampling results during the transportation of samples. The trip blank will be prepared by the laboratory and will be transported inside one of the coolers containing samples. This sample will be analyzed for VOCs.

TABLE 5.1

FIELD QA/QC SAMPLE PROGRAM

PLATTSBURGH AFB

QA/QC Sample Types	Frequency Collected and/or Analyzed	Analytical Methods				
Duplicates	2 Samples (10%)	· VOCs				
Rinseate Blanks	2 Samples (10%)	VOCs				
Field Blanks	1 Sample (5%)	VOCs				
Trip Blanks	One per shipping cooler	VOCs				
Matrix Spike Samples	Once per sampling event	VOCs				
Laboratory Control Sample	Once per method per medium	Laboratory Control Cha (Method Specific)				
Laboratory Method Blanks	Once per method per medium	Laboratory Control Cha (Method Specific)				

Matrix spikes will be prepared in the laboratory and used to establish matrix effects for samples analyzed for VOCs.

LCSs and LMBs will be prepared internally by the laboratory and will be analyzed each day samples from the site are analyzed. Samples will be re-analyzed in cases where the LCS or LMB are out of the control limits. Control charts for LCSs and LMBs will be developed by the laboratory and monitored for the analytical methods used.

SECTION 6

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APPENDIX A

CONTAINERS, PRESERVATIVES, PACKAGING, AND SHIPPING REQUIREMENTS FOR GROUND WATER SAMPLES

Table 8.2a: Containers, Preservation, Packaging, and Shipping Requirements for ASC Ground-Vater Samples

'	Analysis	Bottles and Jars	Preservation	Holding Time	Volume of Sample	shippoing	Normal Packaging
	GROUND WATER	7					
_	וכר אחכי	Two 40-ml vials with Jeffon-lined caps	Cool to 4°C	10 days	fill completely	Delivered daily Bubble pack	Bubble pack
	ICL Scmivolatiles	Ino 1-liter glass bottles with Teflon-lined lids	Cool to 4°C	S days until ex- traction, 40 days after extraction	FIII 90x full	Delivered daily	Bubble pack
	ICL Pesticides/PCBs	Two 1-liter anther glass buttles with Teflon-lined lids	Cool to 4.c	5 days until ex- traction, 40 days after extraction	FIII 75% full	Delivered daily Bubble pack	Bubble pack
	PCDDs/PDDFs	Two 1-liter anber glass bottles with Teflon-lined lids	Cool to 4°C	30 days until extraction, 45 days after extraction	FIII 90% fuil	Delivered daily Bubble Pack	Bubble Pack
	Herbicides	Two 1-liter anber glass bottles with Teflon-lined lids	Cool to 4°C	7 days to extraction, 30 days after extraction	FIII 90% full	Delivered daily	Bubble Pack
	Carbainates	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	28 days	לווו 90% לחון	Delivered daily Bubble Pack	Bubble Pack
	Ethylene dibromide	Two 40-ml vials with Teflon-lined caps	Cool to 4°C	5 days	fill completely	Delivered daily	Bubble Pack
	Ethylene glycul	Two 40-ml vials with Teffon-lined caps	Coul to 4°C	14 days	Fill completely	Delivered daily Bubble Pack	Bubble Pack
	LOW CONCENTRATION (ICL INOUGENIES)	1158.)					3 4 4
100	ICL Hetals	One 1-liter polyethylene bottle	Filter immediately, HNOs to pil <2, cool to 4°C	6 months except Hg 28 days	ווו 90% למון	Delivered daily Bussis pack	Bucole pack

Table 8.2a: (continued) (Page 2 of 5)

Analysis	Bottles and Jars	Preservation	Holding Lime	Volume of Sample	shippoplas	Hormal Packaging
LOW CONCENTRATION (ICL INORGANICS) CONTINNED	Jes) continued			.:		
Cyanide	One 1-liter polyethylene bottie	Filter immediately, 0.6 g ascorbic acid MAOH to pH >12, cool to 4°C,	14 days	111 90% juli	Delivered dally Bubble pack	Bucol e pack
low Concentration.(Organics and Inorganics)	nd Inorganica)					
Autonia	One 1-liter polyethylene bottle	H250, to pil <2 C601 to 4°C	28 days	FILL 90% full	Delivered daily Bubble pack	Bubble pack
Boron	One 1-liter polyethylene bottle	Filter innediately, HAO to pH <2 Cool to 4°C	6 months	נוון 20% לטון	Delivered daily	Bubble pack
fluoride	One 1-liter polyethylene bottle	Filter immediately, Cool to 4°C	28 days	FIII 90% full	Delivered dally Bubble pack	Bubble pack
Sulfate	One i-liter polyethylene bottle	Fitter innediately, Cool to 4°C	.28 days	לווו 20% לחוו	Delivered daily Bubble pack	Bubble pack
Sulfide	One 1-11ter polyethýlene bottle	filter immediately, Zinc acetate and sodium hydroxide to pil >9 Cool to 4°C	7 days	fill 90x futl	Delivered dally	Subble pack
Chloride	One 1-liter polyethylene bottle	Filter innediately, Cool to 4°C	28 days	FILL 90% full	Delivered daily Bubble pack	Bubble pack
Bromlde	One 1-liter polyethylene bottle	filter innediately, Cool to 4°C	28 days	לווו 20% למון	Delivered daily Bubble pack	Bubble pack
Witrate/Witrite	One 1-liter polyethylene bottle	filter innediately, H250, to pH 42	28 days	נווו 20% נחון	Delivered daily Bubble pack	Bubble pack
Alkalinity	One 1-liter polyethylene bottle	2. t o 1 100 T	14 days	נווו אמא ניוון	Delivered dally Bubble pack	Bubble pack

Table 8.2a: (continued) (Page 3 of 5)

Analyeis	Boilles and Jars	Preservation	Holding Time	Volume of Sample	shippoing.	Normal Packaging
Total Phosphorus	One 1-liter polyethylene bottle	H2504 to pH <2 Cool to 4°C	28 days	1111 50x (n)1	Delivered daily	Butble pack
total Organic Carbon	One 1-liter glass bottle	H250, to pil <2 Cool to 4°C	28 days	Fill completely	Delivered daily Bubble pack	Bubble pack
lotal Organic Halides	Two 1-liter glass bottles	H2SO, to pH <2 0.008x MaS ₂ O ₃ if residual chlorine present, cool to	7 days	fill completely	Delivered daily Bubble pack	Bubble pack
Chemical Oxygen Demand	One 1-liter polythylene bottle	4°C H ₂ 50, to pii <2 Cool to 4°C	28 days	FIII 90% full	Delivered daily Bubble pack	Bubble pack
Biological Oxygen Demand	One 1-liter polythylene buttle	Cool to 4°C	48 hours	Fill completely	Delivered daily Bubble pack	Bubble pack
Total Suspended Solids	One 1-liter polythylene bottle	Cool to 4°C	7 days	Fill completely	Delivered daily Bubble pack	Bubble pack
Total Dissolved Solids	One 1-liter polythylene	Cool to 4.c	48 hours	FIII 90% full	Delivered daily Bubble pack	Bulble pack
Corrusivity	bottle One 1-liter glass bottle	Cool to 4°C	28 days	FIII 90% full	Delivered dally	Bubble pack
70.	One 1-liter glass bottle	Cool to 4.c	28 days	FIII 90% full	Delivered daily	Bubble pack
Specific Controlance	One 1-liter polyethylene bottle	Coul to 4°C	28 days	FILL 90% full	Delivered daily Bubble pack	Bubble pack
Radionuclides:						
Gross alpha and beta	One 1-liter polyethylene bottle	Filter innediately, HNO, to pH <2 Coul to 4°C	6 months	FILL 90X Full	Delivered daily Bubble pack	Bubble pack
10001	One 1-liter polyethylene bottle	Filter immediately, HHO to pil <2 Cool to 4°C	6 months	fill 90x full	Delivered daily Bubble pack	. Bubble pack

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Tuble 8.2s: (continued) (page 4 of 5)

Filter inmediately, 6 months filt 90x Full Delivered dally HNO to pH <2 Cool to 4°C Cool t							
Filter immediately, 6 months filt 90x Fult D Cool to 4°C Filter immediately, 6 months filt 90x Fult of HVO, to pH <2 Cool to 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Filter immediately, 6 months filt 90x Fult of 4°C Cool to 4°C	Bott	Bottles and Jars	Preservation	Holding Ilme	Volume of Sample	- Sh (populng	Normal Packaging
Filter launcdiately, 6 months Filter launcdiately, 6 months	One 1-111 bottle	One 1-liter polyethylene bottle	Filter inmediately, HHO, to pil <2 Cool to 4°C	6 months	FIII 90% Full	Delivered daily	Bubble pack
Filter lamediately, 6 months HWO to pH <2 Cool to 4°C Filter inmediately Filter lamediately, 6 months	One 1-11 bottle	One 1-liter polyethylene bottle	Filter lamediately, HHO, to pH <2 Cool to 4°C	6 months	FILL 90% Full	Delivered daily	Bubble pack
Filter immediately 6 months filt 90% full Cool to 4°C Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filt 90% full Filter immediately, 6 months filter immediately, 6 months filts 90% full Filter immediately, 6 months filts 90% full Good to 4°C Cool to 4°C	One 1-11 bottle	One 1-liter polyethylene bottle	Filter immediately, HNO, to pH <2 Cool to 4°C	6 months	fill 90% Full	Delivered dally	Bubble paci
Filter lanediately, 6 months Filt 90x Full Filter lanediately, 6 months Filt 90x Full HNO to pH <2 Cool to 4°C Filter lanediately, 6 months Filt 90x Full HNO to pil <2 Cool to 4°C Filter lanediately, 6 months Filt 90x Full Filter lanediately, 6 months Filtra lanediately, 6 months Filtra lanediately, 6 months Filtra lanediately, 6 months Filtra lanediately, 6 months Filtra lanediately, 6 months Filtra lanediately,	One 1-11 bottle	ter polyethylene	Filter inmediately HHO, to pil <2 Cool to 4°C	6 months	FIII 90X Full	Delivered dally	Bubble pack
Filter immediately, 6 months fill 90x Full HHO, to pH <2 Cool to 4°C	One 40-m	l vial with ined cup	Filter immediately, Cool to 4.0	6 months	FIII 90% Full	Delivered dail)	Bubble pac
Filter immediately, 6 months Filt 90% Full HNO to pil <2 Cool to 4°C Cool to	One 1-111 bottle	ter polyethylene	Filter innediately, HHO; to pH <2 Cool to 4°C	6 months	Fill 90x Full	Delivered dall	and a room a
Filter inmediately, 6 months filt 90% Full HNO ₂ to pil <2 Cool to 4°C Cool to 4°C Filter inmediately, 6 months filt 90% Full HNO ₂ to pil <2 Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C Cool to 4°C	One 1-11 bottle	ter polyethylene	Filter immediately, HNO ₁ to pil <2 Cool to 4°C	6 months	FIII 90% Full	Delivered dail	y Bubble pa
Filter innediately, 6 months Filt 90% Full HNO, to pil <2 Cool to 4°C filter innediately, 6 months Filt 90% Full HNO, to pil <2 Cool to 4°C Cool to 4°C	One 1-11 bottle	ter polyethylene		6 months	fill 90% Full	Delivered dall	y Bubble p
Filter immulately, 6 months Filt 90% full ling to pil <2 Cool to 4°C	One 1-1 bottle	iter polyethylene	•	6 months	FIII 90% Full	Delivered dail	y Bubble pa
	Two 1-1 bottles	iter polyethylene		6 months .	FIII 90% Full	Delivered dall	y subble pa

Table 8.2s: (continued) (Puge 5 of 5)

				Volume of	•	Korma!
	Bottles and Jars	Preservation	Holding Time	Sample	Shippoing	Packaging
Analysis					- 11 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	9.44 c nack
	one itiliter polyethylene	filter inmediately,	6 months	FILL 90% Full	Delivered daily Buttle pack	מתמוב הפרא
Thoritm-232	bottle	HHOS to pil <2		•:		
		Cool to 4.c		•		
		•				

Note: Parameters with similar containers and preservation requirements may be conbined

APPENDIX B AVAILABLE SOIL AND GROUNDWATER ANALYTICAL RESULTS

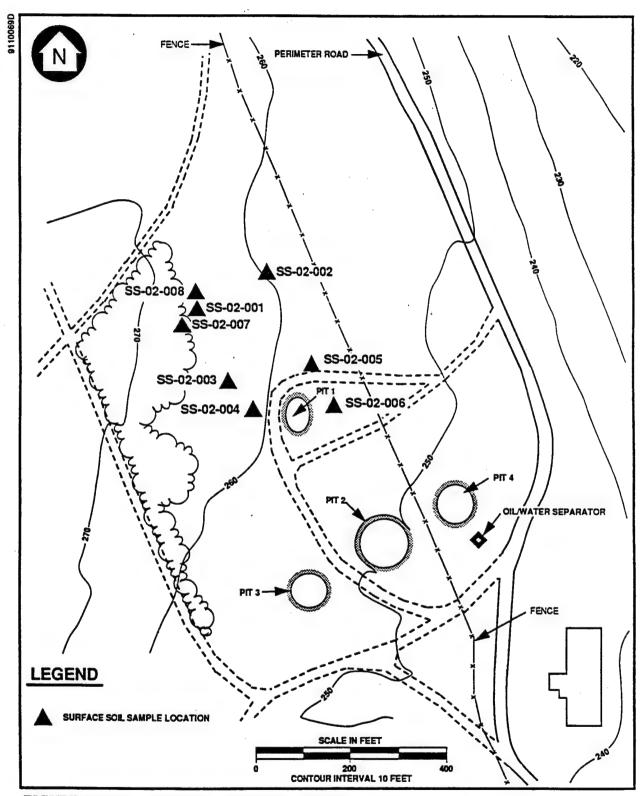


FIGURE 2-4: Phase I RI Surface Soil Sample Locations

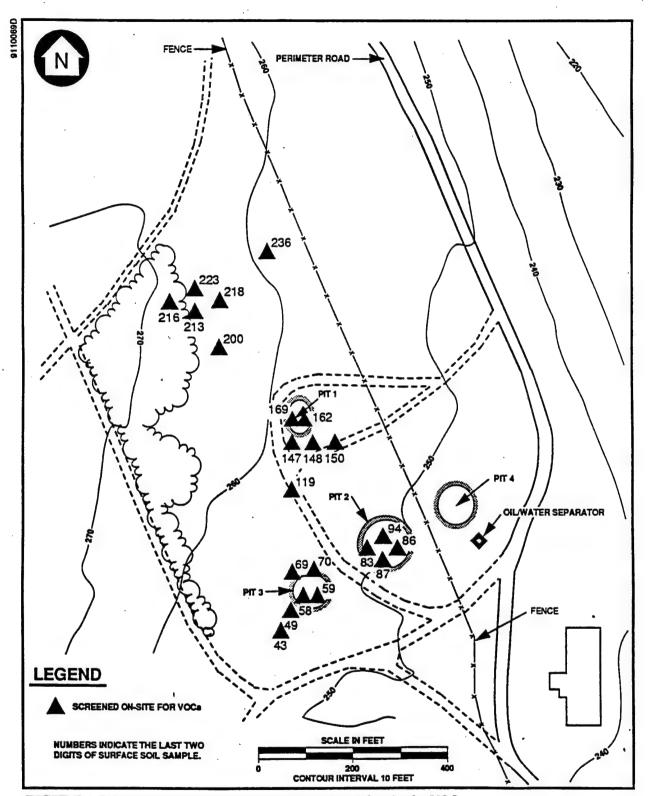


FIGURE 2-7: Phase II RI Surface Soil Samples Analyzed On-site for VOCs

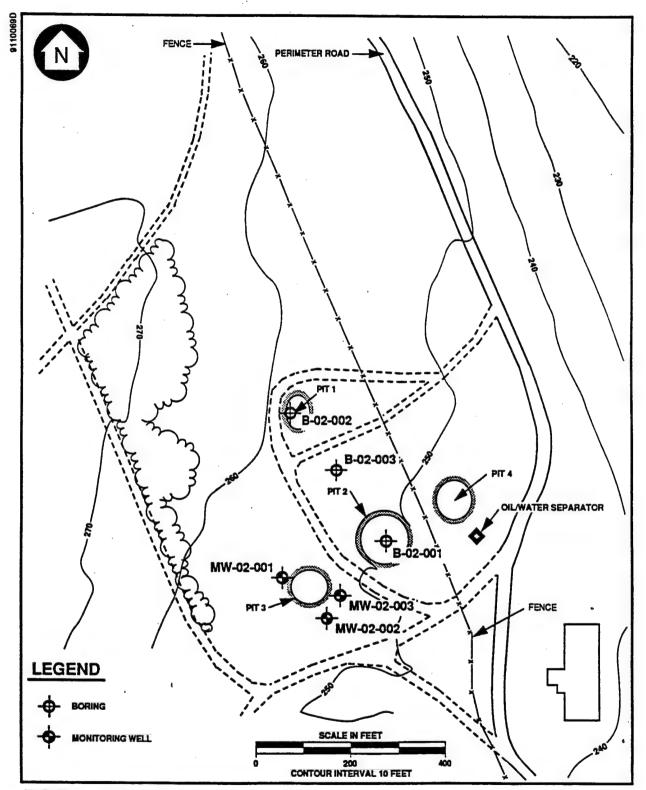


FIGURE 2-10: SI Subsurface Soil Explorations

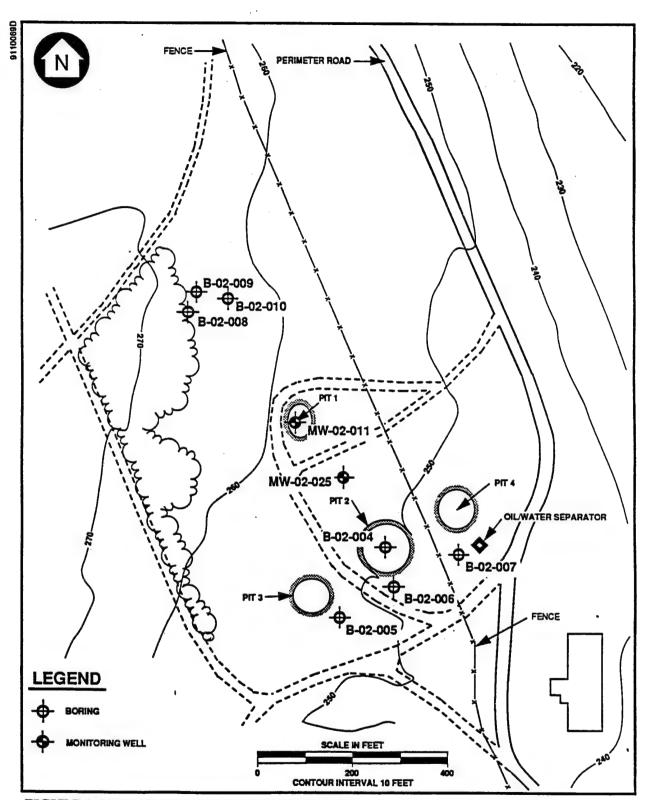


FIGURE 2-11: Phase I RI Subsurface Soil Explorations

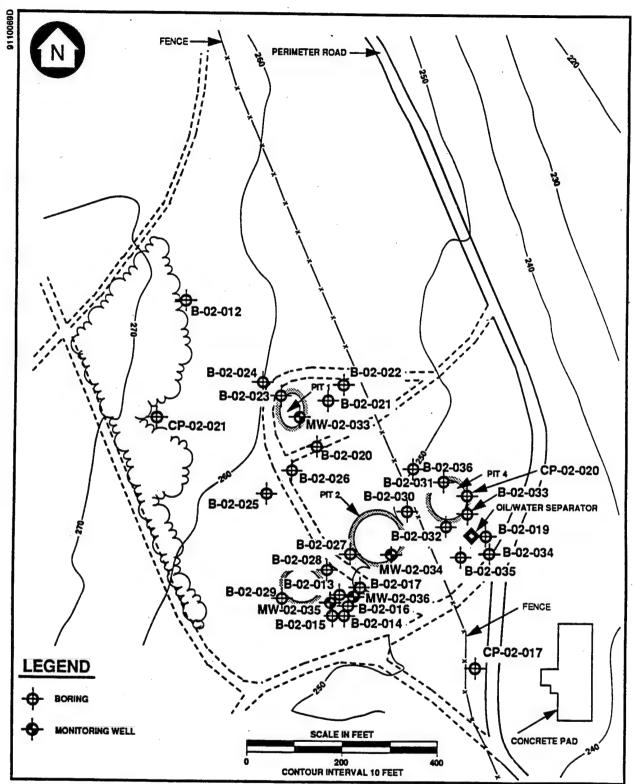


FIGURE 2-12: Phase II RI Subsurface Soil Explorations

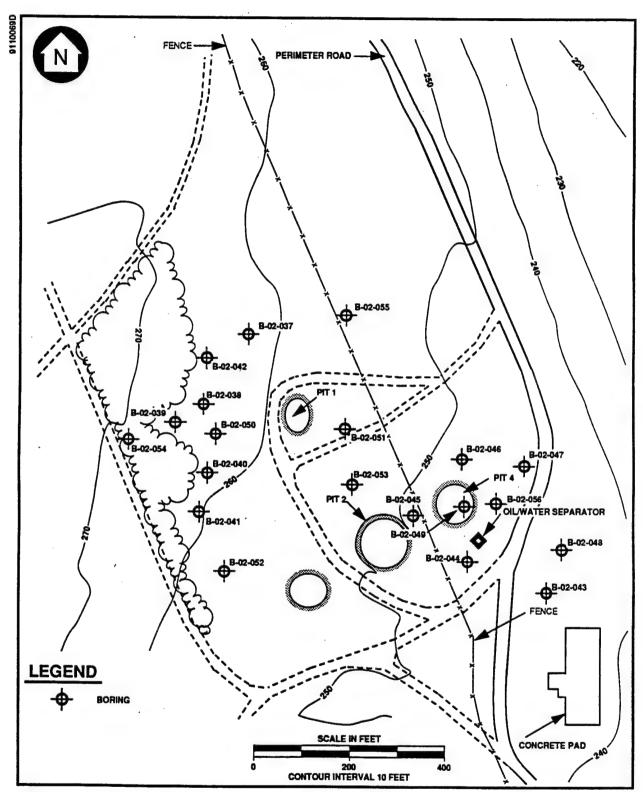
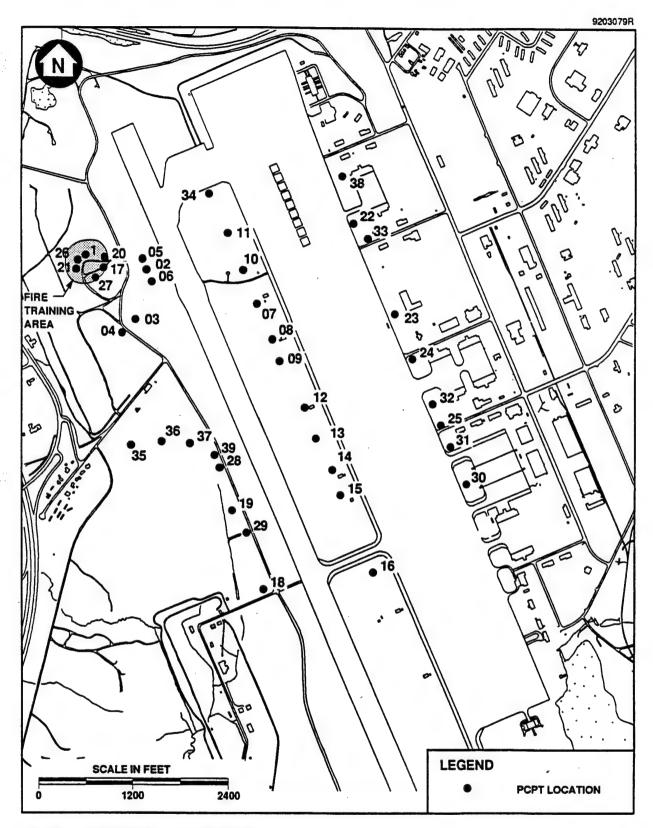
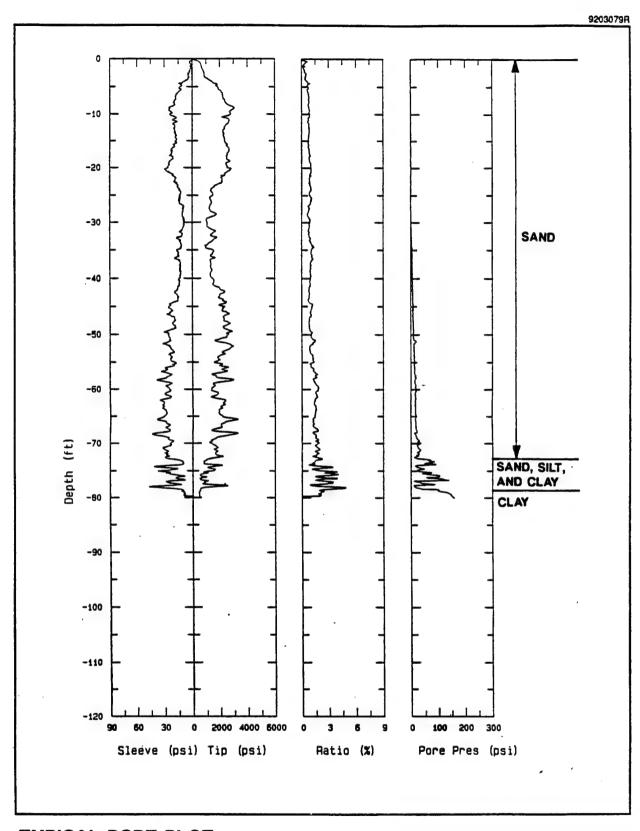


FIGURE 4-13: FT-002 Subsurface Explorations - October 1991



PCPT BORING LOCATIONS



TYPICAL PCPT PLOT

The following PCPT borings did not have stratigraphic logs made as they were located close to an existing logged well or another logged PCPT boring.

CP-02-006

CP-02-011

CP-02-016

CP-02-026

CP-02-027

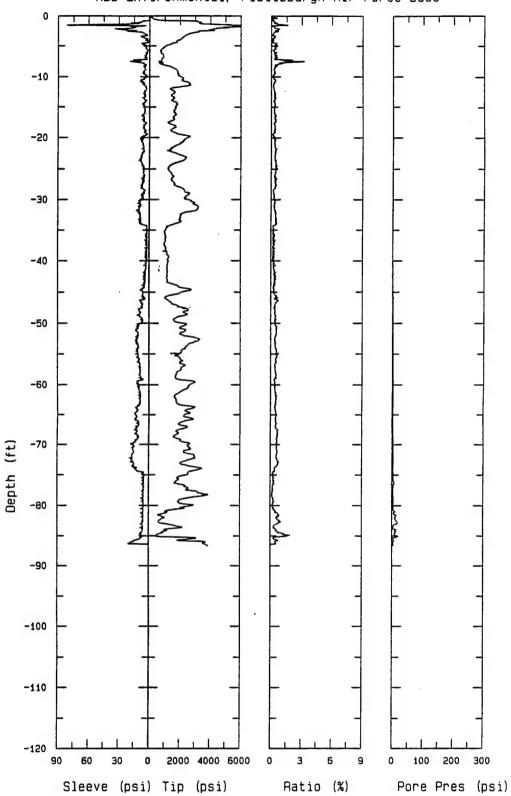
CP-02-029

CP-02-032

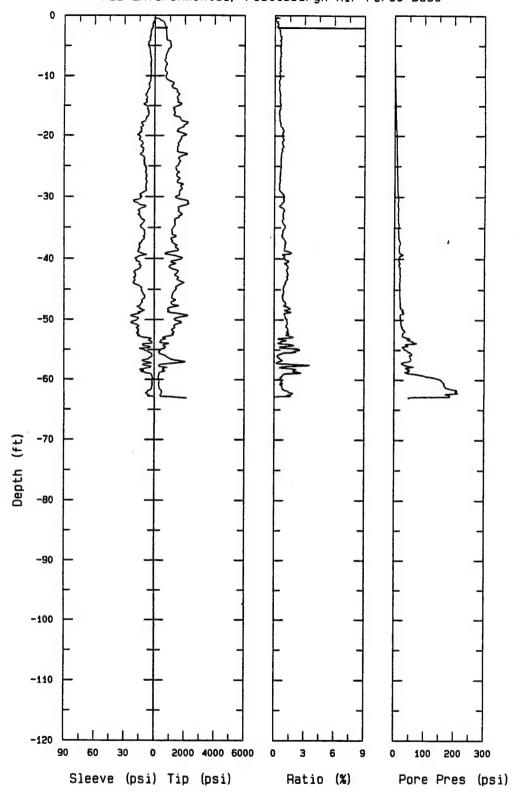
CP-02-033

CP-02-038

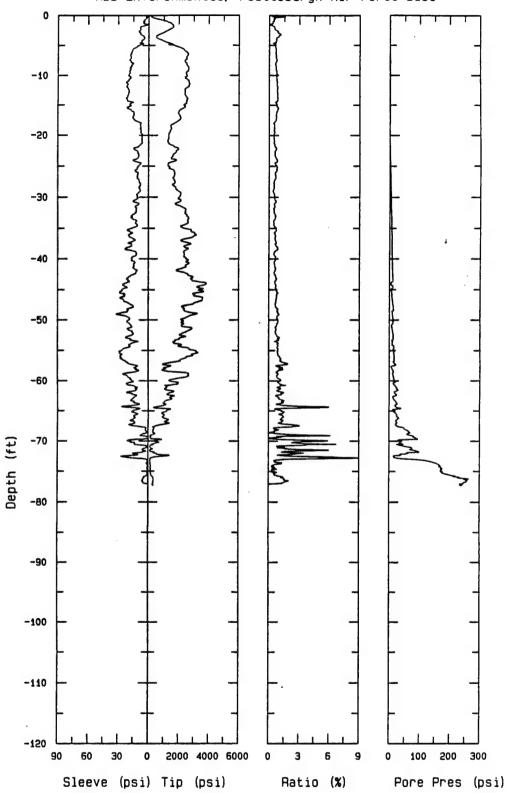
CP-02-039



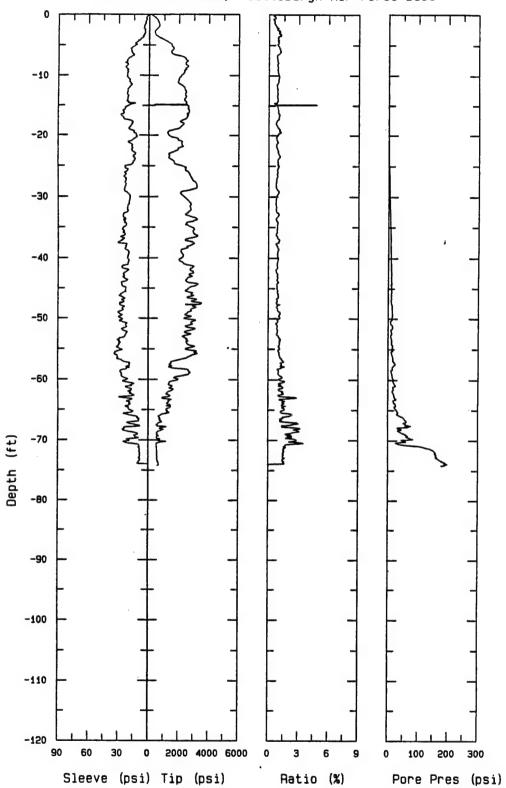
CP-02-002 Applied Research Associates, Inc. 06/10/91 ABB Environmental, Plattsburgh Air Force Base

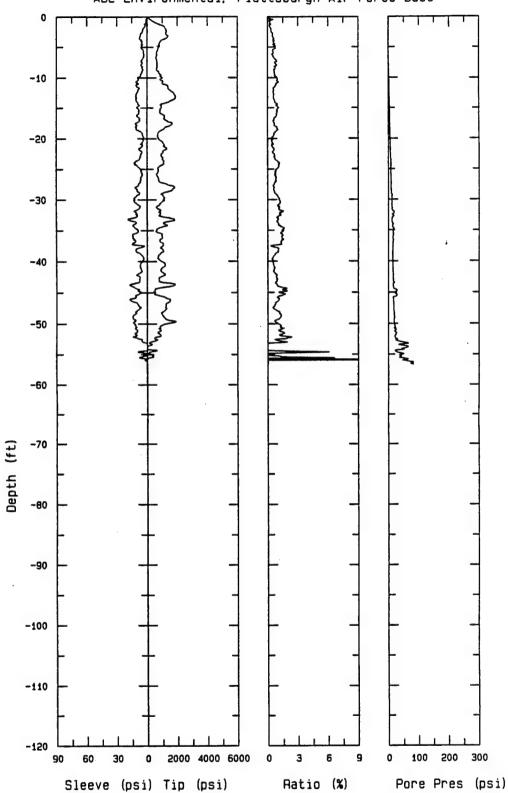


CP-02-003 Applied Research Associates, Inc. 06/10/91 ABB Environmental, Plattsburgh Air Force Base



CP-02-004 Applied Research Associates, Inc. 06/10/91 ABB Environmental, Plattsburgh Air Force Base



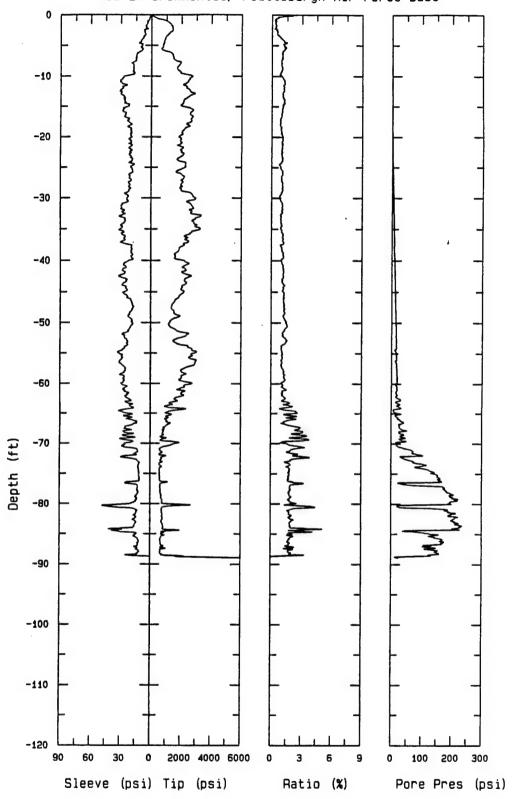


CP-02-007 Applied Research Associates, Inc. 06, ABB Environmental, Plattsburgh Air Force Base -10 -20 -30 -40 -50 -60 Depth (ft) -70 -80 -90 -100 -110 -120 90 60 30 2000 4000 5000 100 200 300

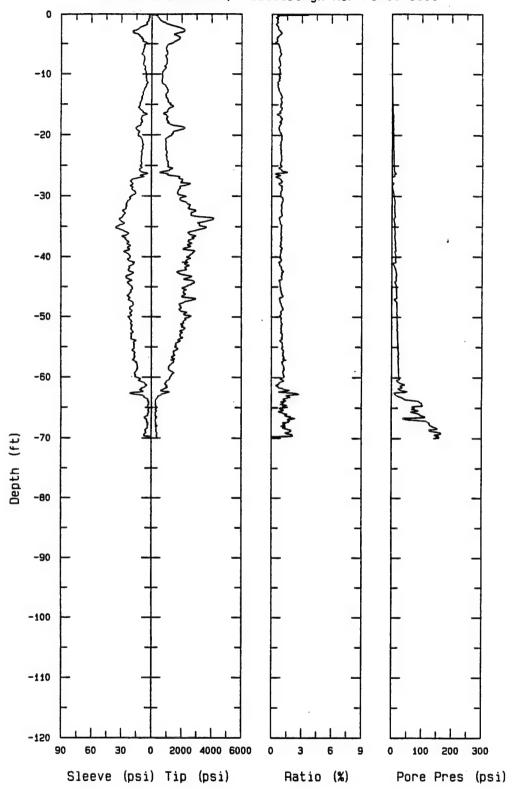
Ratio (%)

Pore Pres (psi)

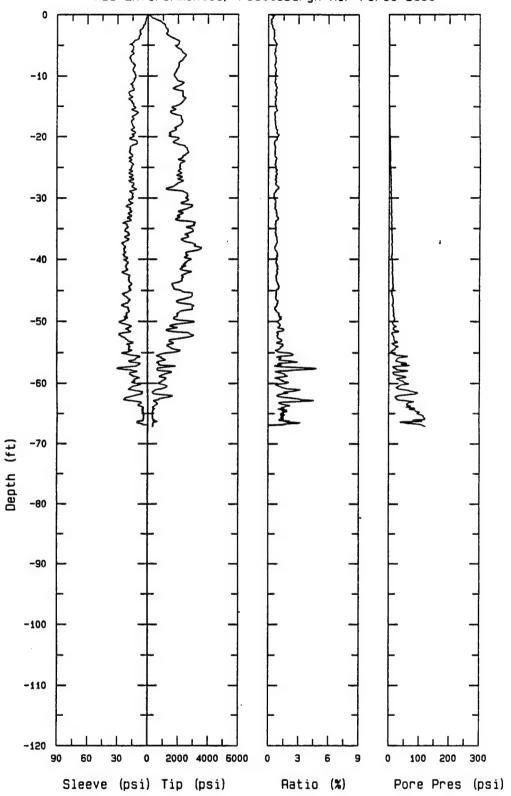
Sleeve (psi) Tip (psi)



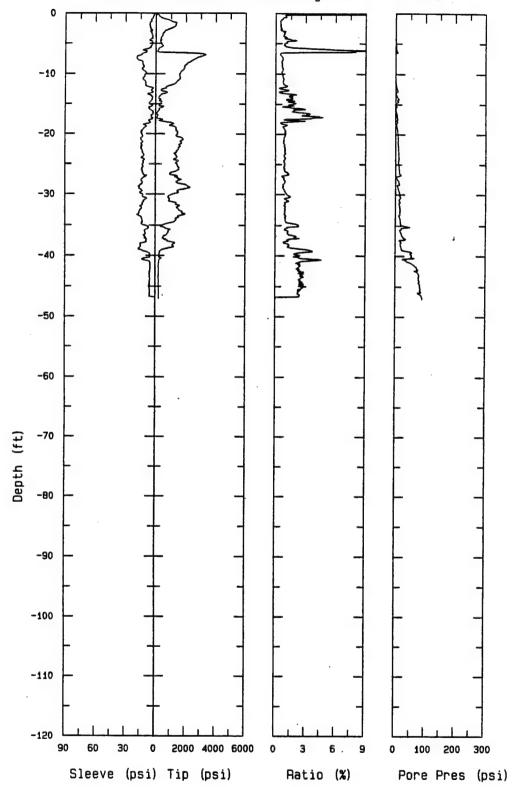
CP-02-009 Applied Research Associates, Inc. 06/14/91 AB3 Environmental, Plattsburgh Air Force Base



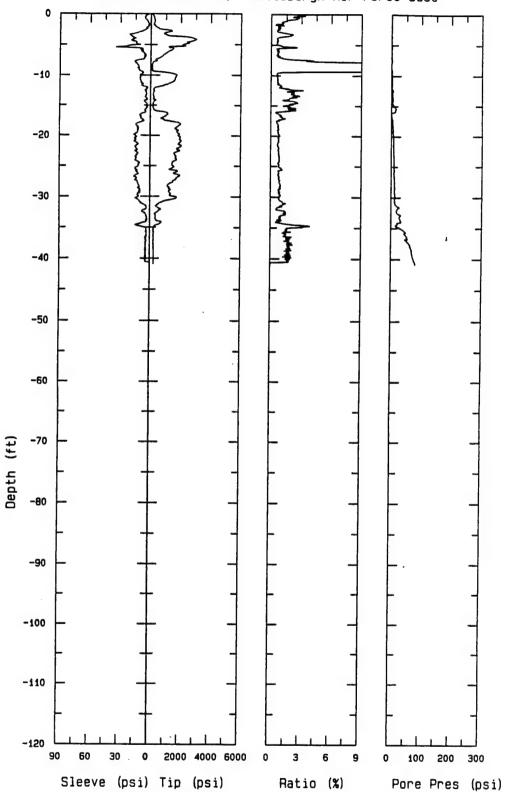
CP-02-010 Applied Research Associates, Inc. 06/17/91 ABB Environmental, Plattsburgh Air Force Base



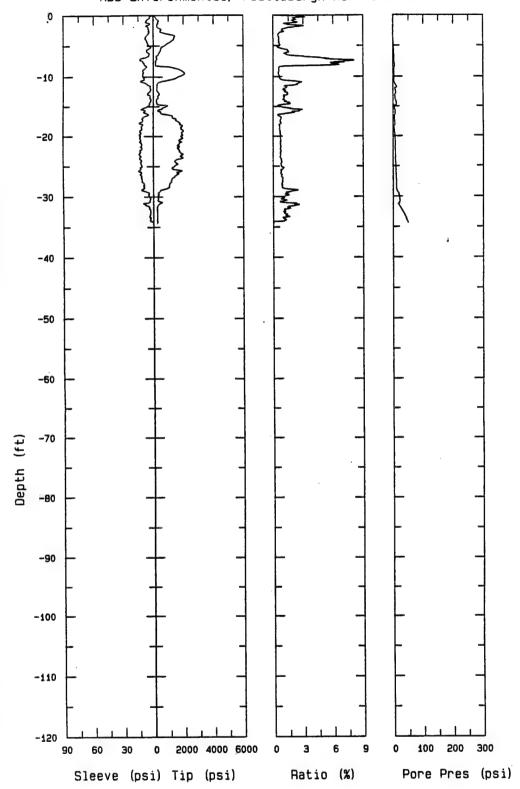
CP-02-012 Applied Research Associates, Inc. 06/17/91 ABB Environmental, Plattsburgh Air Force Base

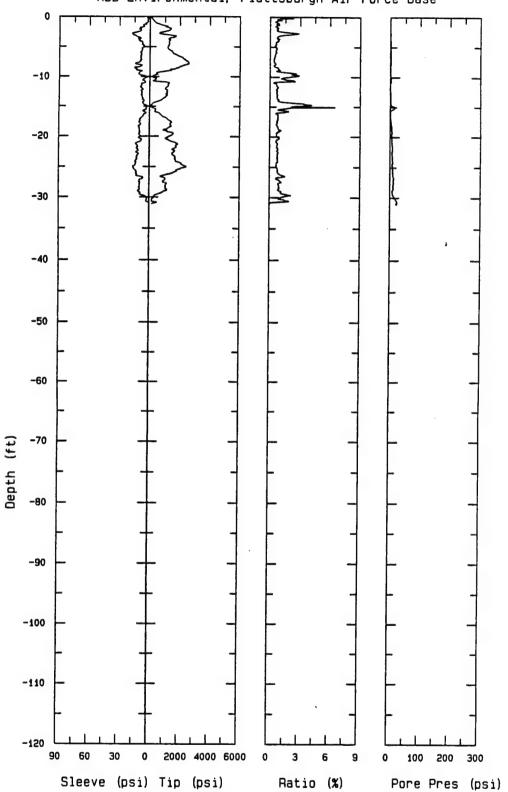


CP-02-013 Applied Research Associates, Inc. 06/17/91 ABB Environmental, Plattsburgh Air Force Base



CP-02-014 Applied Research Associates, Inc. 06/17/91 ABB Environmental, Plattsburgh Air Force Base





CP-02-017 Applied Research Associates, Inc. 06, ABB Environmental, Plattsburgh Air Force Base 05/19/91 -10 ~20 -30 -40 -50 -60 -70 Depth (ft) -80 -90 -100 -110

-120

60

30

Sleeve (psi) Tip (psi)

2000 4000 6000

100

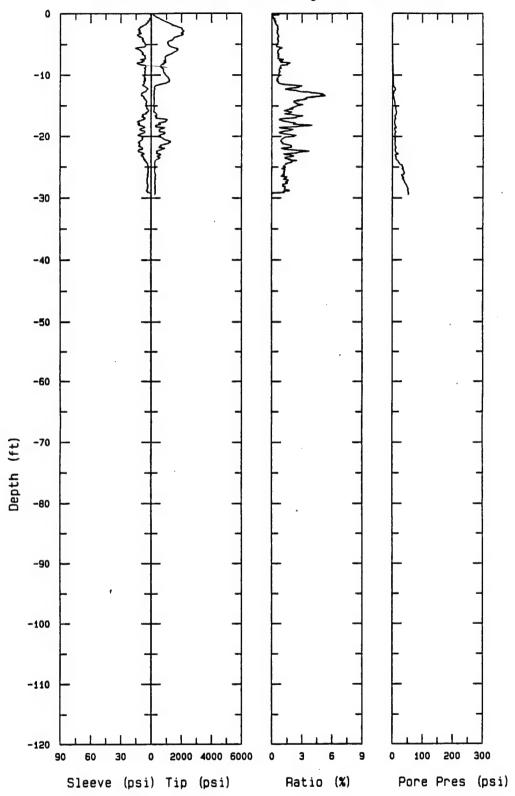
Ratio (%)

200

Pore Pres (psi)

300

CP-C2-018 Applied Research Associates, Inc. 06/19/91 ABB Environmental, Plattsburgh Air Force Base



CP-02-019 Applied Research Associates, Inc. 06/25/91 ABB Environmental, Plattsburgh Air Force Base -10 -20 -30 -40 -50 -60 -70 Depth (ft) -80 -90 -100 -110 -120

30

Sleeve (psi) Tip (psi)

2000 4000 6000

0

3

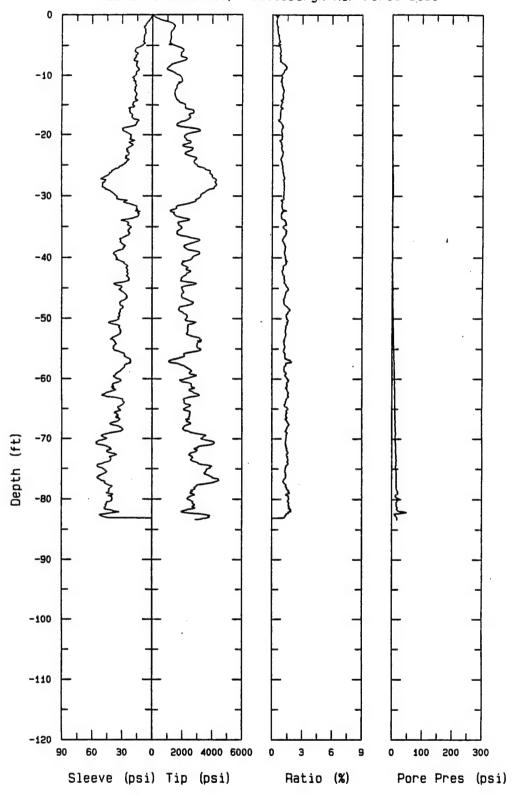
Ratio (%)

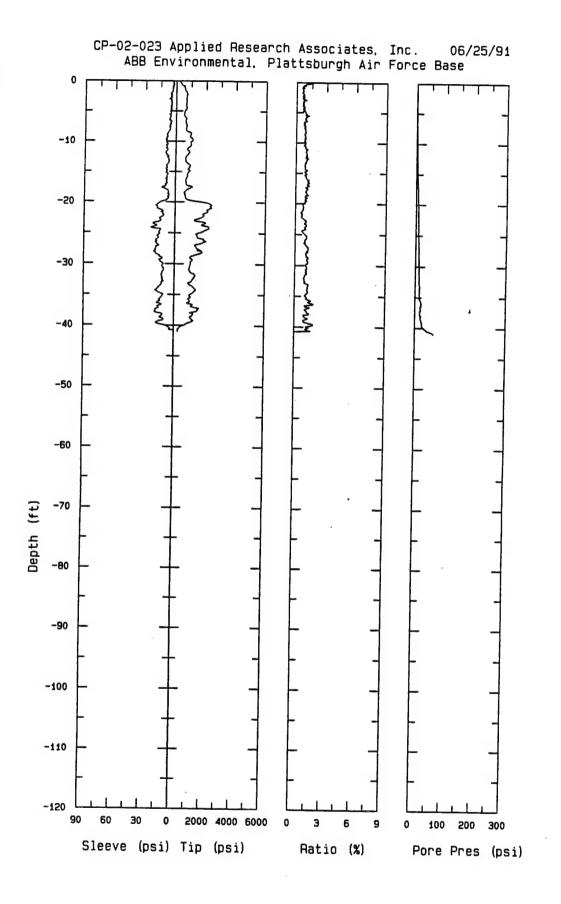
200

Pore Pres (psi)

100

CP-02-021 Applied Research Associates, Inc. 06/25/91 AE3 Environmental, Plattsburgh Air Force Base





CP-02-024 Applied Research Associates, Inc. 06/25/91 ABB Environmental, Plattsburgh Air Force Base -10 -50 -30 -40 -50 -60 -70 Depth (ft) -80 -90 -100 -110 -120

2000 4000 6000

Sleeve (psi) Tip (psi)

100

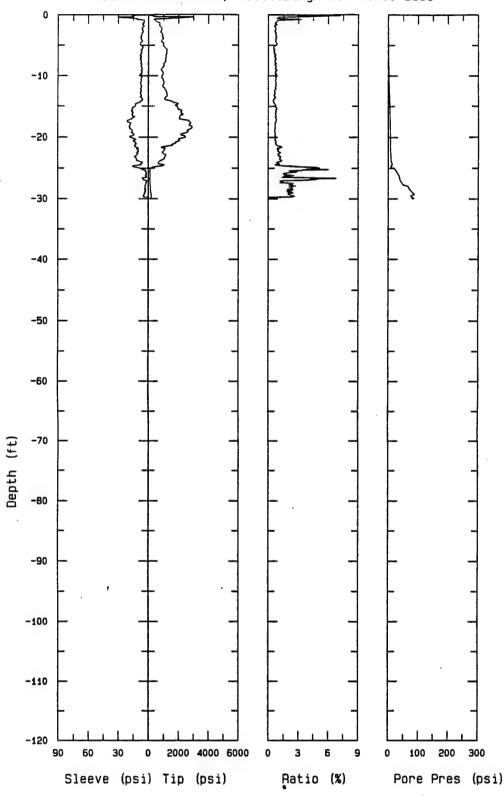
Ratio (%)

200

Pore Pres (psi)

300

CP-02-025 Applied Research Associates, Inc. 06/25/91 ABB Environmental, Plattsburgh Air Force Base



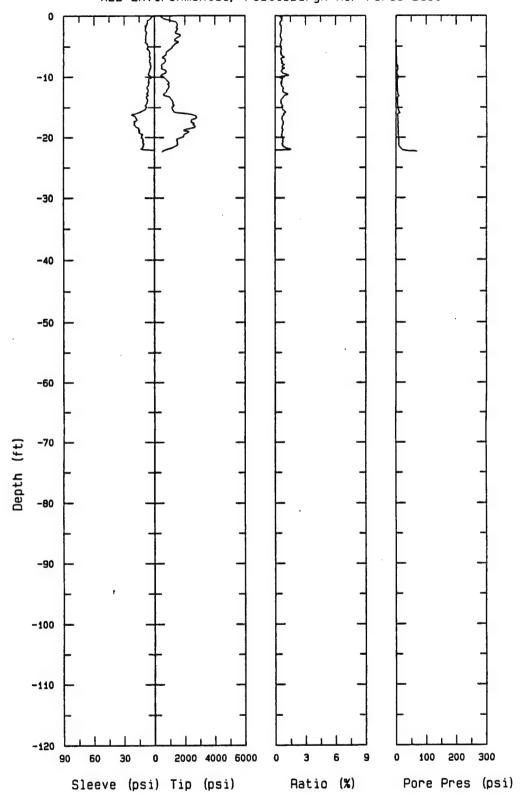
Ratio (%)

Pore Pres (psi)

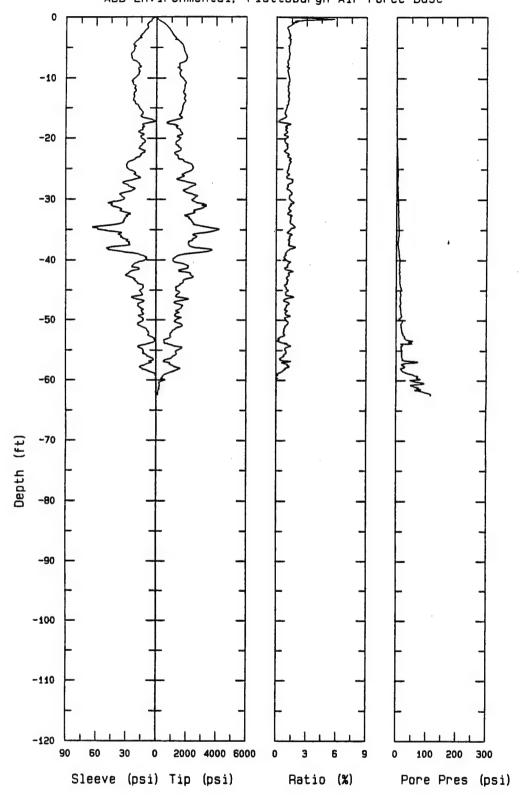
Sleeve (psi) Tip (psi)

CP-02-030 Applied Research Associates, Inc. 06, ABB Environmental, Plattsburgh Air Force Base 06/27/91 -10 -30 -40 -50 -60 Depth (ft) -70 -80 -90 -100 -110 -120 2000 4000 6000 100 200 300 Sleeve (psi) Tip (psi) Ratio (%) Pore Pres (psi)

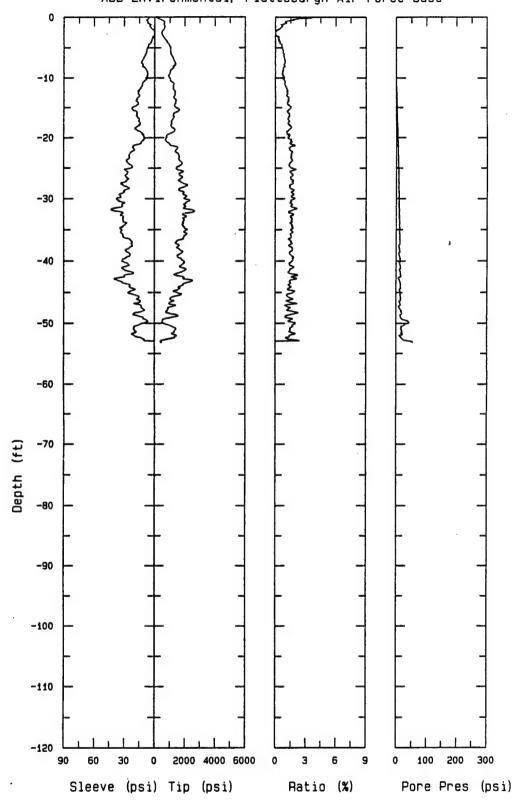
CP-02-031 Applied Research Associates, Inc. 06/27/91 ABB Environmental, Plattsburgh Air Force Base



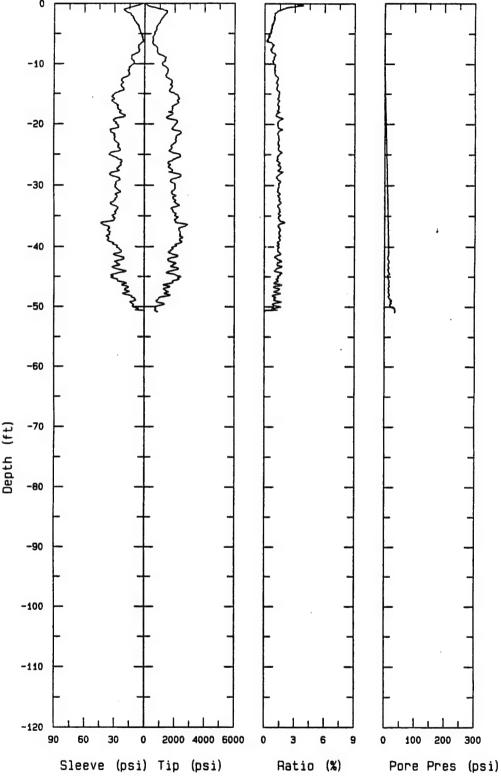
CP-02-034 Applied Research Associates, Inc. 06/27/91 ABB Environmental, Plattsburgh Air Force Base



CS-02-035 Applied Research Associates, Inc. 06/27/91
ABB Environmental, Plattsburgh Air Force Base



CP-02-036 Applied Research Associates, Inc. 06/27/91 ABB Environmental, Plattsburgh Air Force Base



CP-02-037 Applied Research Associates, Inc. 06/27/91 ABB Environmental, Plattsburgh Air Force Base -10 -50 -30 -40 -50 -60 -70 Depth (ft) -80 -90 -100 -110

-120 L 90

60

30

Sleeve (psi) Tip (psi)

2000 4000 6000

100 200

Pore Pres (psi)

Ratio (%)

300

9

PLATTSBURG AFB, SCREENING DATA 1991 ALL SITES - HITS ONLY GC FIELD SCREENING RESULTS

(WATER: $\mu g/L$)

				•			
PT LOCATION	SAMPLE ID	DEPTH (FT)	MATRIX	COMPOUND	CONCENTRATION	DILUTION	QUAL
CP-02-001	02CW00105001XF	50	Water	Toluene	1.4	1.0	J5
CP-02-001	02CW00105501XF	55	Water	Trichloroethene	1.3	1.0	J5
CP-02-002	02CW00202001XF	20	Water	Trichloroethene	47	10.0	J5
CP-02-002	02CW00203701XF	37	Water	***************************************	ND	1.0	
CP-02-002	02CW00205201XF	52	Water	C-1,2-Dichloroethene	1.1	1.0	
CP-02-002		52		Trichloroethene	21	1.0	
CP-02-002	02CW00205801XF	58	Water		ND	1.0	
CP-02-003	02CW00302301XF	23	Water	Benzene	2.0	1.0	J5
CP-02-003		23		Ethylbenzene	1.4	1.0	J5
CP-02-003		23	Water	C-1,2-Dichloroethene	120	10.0	
CP-02-003	02CW00303201XF	32	Water	C-1,2-Dichloroethene	210	10.0	
CP-02-003	· · · · · · · · · · · · · · · · · · ·	32		Benzene	15	10.0	J5
CP-02-003		32		Ethylbenzene	15	10.0	J5
CP-02-003	02CW00304101XF	41	Water	C-1,2-Dichloroethene	160	33.0	J5
CP-02-003		41		Ethylbenzene	66	33.0	J5
CP-02-003	02CW00305501XF	55	Water	C-1,2-Dichloroethene	84	10.0	
CP-02-003	OPC 11 0020220 IVL	55	· · · atti	Ethylbenzene	16	10.0	J5
CP-02-003	02CW00306701XF	67	Water	C-1.2-Dichloroethene	1.2	1.0	J5
CP-02-004	02CW00403001XF	30	Water	Trichloroethene	1.0	1.0	J5
CP-02-004	02CW00404601XF	46	Water	Trichloroethene	20	1.0	35
CP-02-004	02CW00405601XF	56	Water	Tremorocutene	ND ND	1.0	
CP-02-004	02CW00406401XF	64	Water		ND	1.0	
CP-02-005	02CW00501701XF	17	Water	Trichloroethene	6.6		-
CP-02-005	02CW00502801XF	28	Water	1 ricmoroemene		1.0	
					ND	1.0	
CP-02-005	02CW00504201XF	42	Water Water		ND	1.0	
CP-02-005 CP-02-005	02CW00504601XF 02CW00505001XF	46 50	Water		ND	1.0	
CP-02-006		15	Water	Trichloroethene	ND	1.0 .	
	02CW00601501XF		1		630	20.0	E
CP-02-006	02CW00602401XF	24	Water	C-1,2-Dichloroethene	180	100.0	J1 -
CP-02-006	0000110000022013/F	24	377.	Trichloroethene	3,400	100.0	E
CP-02-006	02CW00603301XF	33	Water	C-1,2-Dichloroethene	850	100.0	J1
CP-02-006	00.011/00/04/04/17	33		Trichloroethene	3,500	100.0	E
CP-02-006	02CW00604401XF	44	Water	Trichloroethene	430	50.0	
CP-02-006	02CW00605501XF	55	Water	C-1,2-Dichloroethene	11	10.0	J1
CP-02-006	· · · · · · · · · · · · · · · · · · ·	55		Trichloroethene	330	10.0	E
CP-02-006		55		Tetrachloroethene	11	10.0	J5
CP-02-007	02CW00702201XF	22	Water	Trichloroethene	12	1.0	
CP-02-007	02CW00703101XF	31	Water	Trichloroethene	54	10.0	
CP-02-007	02CW00704501XF	45	Water	C-1,2-Dichloroethene	240	100.0	J5
CP-02-007	00.000000000000000000000000000000000000	45		Trichloroethene	4,900	100.0	E
CP-02-007	02CW00705601XF	56	Water	Trichloroethene	26	1.0	J9
CP-02-008	02CW00802801XF	28	Water	C-1,2-Dichloroethene	670	20.0	E
CP-02-008		28		Trichloroethene	52	20.0	J5
CP-02-008	02CW00804301XF	43	Water	C-1,2-Dichloroethene	2,000	50.0	E
CP-02-008		43		Trichloroethene	1,500	50.0	E
CP-02-008	02CW00805201XF	52	Water	C-1,2-Dichloroethene	1,700	100.0	
CP-02-008		52		Trichloroethene	3,200	100.0	E
CP-02-008	02CW00805701XF	57	Water	C-1,2-Dichloroethene	510	100.0	
CP-02-008		57		Trichloroethene	3,300	100.0	E
CP-02-008		57		Benzene	240	100.0	J5
CP-02-008	02CW00807001XF	70	Water		ND	1.0	

PLATTSBURG AFB, SCREENING DATA 1991 ALL SITES - HITS ONLY GC FIELD SCREENING RESULTS

(WATER: $\mu g/L$)

PCPT LOCATION	SAMPLE ID	DEPTH (FT)	MATRIX	COMPOUND	CONCENTRATION	DILUTION	QUAL
CP-02-009	02CW00901601XF	16	Water	C-1,2-Dichloroethene	14	1.0	
CP-02-009	02CW00902801XF	28	Water	C-1,2-Dichloroethene	19	1.0	
CP-02-009	02CW00903501XF	35	Water	Benzene	2.8	2.0	15
CP-02-009		35		C-1,2-Dichloroethene	700	20.0	E
CP-02-009	02CW00904401XF	44	Water	C-1,2-Dichloroethene	10,000	1000.0	
CP-02-009	02CW00905401XF	54	Water	C-1,2-Dichloroethene	790	100.0	
CP-02-009	02CW00906001XF	60	Water	C-1,2-Dichloroethene	20	10.0	J5
CP-02-010	- 02CW01003001XF	30	Water	Trichloroethene	5.3	1.0	
CP-02-010	02CW01004601XF	46	Water	C-1,2-Dichloroethene	19	1.0	
CP-02-010		46		Trichloroethene	5.5	1.0	
CP-02-010	02CW01005401XF	54	Water		ND	1.0	
CP-02-011	02CW01103501XF	35	Water	Trichloroethene	1.4	1.0	J5
CP-02-011	02CW01104801XF	48	Water	C-1,2-Dichloroethene	17	1.0	
CP-02-011		48		Trichloroethene	6.2	1.0	
CP-02-012	02CW01201501XF	15	Water	C-1.2-Dichloroethene	42	10.0	J5
CP-02-012	02001201001111	15		Trichloroethene	19	10.0	15
CP-02-012	02CW01202501XF	25	Water	C-1,2-Dichloroethene	2,100	100.0	
CP-02-012	020.01202001711	25		Trichloroethene	1,500	100.0	
CP-02-012	02CW01203401XF	34	Water	C-1,2-Dichloroethene	8.7	2.0	J5
CP-02-012	020 1101203 401711	34		Trichloroethene	6.4	2.0	J5
CP-02-013	02CW01301001XF	18	Water		ND	1.0	
CP-02-013	02CW01302001XF	20	Water	Trichloroethene	190	20.0	
CP-02-013	02CW01302801XF	28	Water	C-1,2-Dichloroethene	3.7	2.0	J5
CP-02-013	OZE WOISOZBOTAL	28		Trichloroethene	8.4	2.0	J5
CP-02-013	02CW01401001XF	10	Water	1110.110100101010	ND	1.0	
CP-02-014	02CW01401001XF	22	Water	Trichloroethene	150	10.0	
CP-02-015	02CW01500801XF	8	Water	Trichloroethene	1.8	1.0	J5
CP-02-015	02CW01501201XF	12	Water	Triemorodaleno	ND	1.0	
CP-02-015	02CW01502501XF	25	Water	C-1,2-Dichloroethene	1.3	1.0	J5
CP-02-015	020 W 01302301741	25	******	Trichloroethene	15	1.0	
CP-02-016	02CW01601701XF	17	Water	Triciaciocalcile	ND	1.0	
CP-02-016	02CW01603201XF	32	Water		ND	1.0	
CP-02-017	02CW01703501XF	35	Water	<u> </u>	ND	1.0	
CP-02-017	02CW01704201XF	42	Water		ND	1.0	
CP-02-017	02CW01705001XF	50	Water		ND	1.0	
CP-02-017	02CW01705801XF	58	Water		ND	1.0	
CP-02-017	02CW01801001XF	10	Water	Trichloroethene	1.4	1.0	J5
	02CW01802001XF	20	Water	Tricinorocalcite	ND	1.0	
CP-02-018	02CW01900901XF	9	Water		ND	1.0	
CP-02-019	02CW01900901XF	19	Water	C-1,2-Dichloroethene	16	1.0	
CP-02-019		35	Water	C-1,2-Dichloroethene	290	20.0	
CP-02-020	02CW02003501XF	46		C-1,2-Dichloroethene	27,000	500.0	Е
CP-02-020	02CW02004601XF	46	Water	Trichloroethene	500	500.0	J5
CP-02-020					11,000	500.0	J1
CP-02-020		46		Toluene	1,100	500.0	J5
CP-02-020	020110200500417	46	11/20	m/p-Xylene	12	1.0	13
CP-02-020	02CW02005901XF	59 70	Water	C-1,2-Dichloroethene C-1,2-Dichloroethene	16	1.0	-
CP-02-020	02CW02007001XF		water		6.9		J1
CP-02-020		70		Toluene		1.0	15
CP-02-020		70		Ethylbenzene	1.2	1.0	
CP-02-020		70	 	m/p-Xylene	4.5	1.0	J5
CP-02-020		70		o-Xylene	1.5	1.0	J5

PLATTSBURG AFB, SCREENING DATA 1991 ALL SITES - HITS ONLY GC FIELD SCREENING RESULTS

(WATER: μg/L)

PT LOCATION CP-02-021	SAMPLE ID	DEPTH (FT)	MATRIN	GOV (DOLLIND			
CP-02-021		DEI III (I I)	MATRIX	COMPOUND	CONCENTRATION	DILUTION	QUAL
CF-02-021	02CW02104601XF	46	Water		ND	1.0	
CP-02-021	02CW02105301XF	53	Water		ND	1.0	
CP-02-022	02CW02201801XF	18	Water		ND	1.0	
CP-02-022	02CW02203201XF	32	Water	C-1,2-Dichloroethene	5.8	1.0	
CP-02-022	02CW02204101XF	41	Water	C-1,2-Dichloroethene	11	1.0	
CP-02-022	02CW02205101XF	51	Water		ND	1.0	
CP-02-023	02CW02301201XF	12	Water		ND	1.0	
CP-02-023	02CW02302201XF	22	Water		ND	1.0	
CP-02-023	02CW02302801XF	28	Water	· · · · · · · · · · · · · · · · · · ·	ND	1.0	
CP-02-023	02CW02303701XF	37	Water		ND	1.0	
CP-02-024	02CW02401001XF	10	Water		ND	1.0	
CP-02-024	02CW02401801XF	18	Water		ND	1.0	
CP-02-024	02CW02403001XF	30	Water		ND	1.0	
CP-02-025	02CW02500801XF	8	Water		ND	1.0	
CP-02-025	02CW02501801XF	18	Water	Trichloroethene	50	5.0	
CP-02-025	02CW02502501XF	25	Water		ND	1.0	
CP-02-026	02CW02605001XF	50	Water	W	ND	1.0	
CP-02-026	02CW02606201XF	62	Water		ND	1.0	
CP-02-027	02CW02704201XF	42	Water		ND	1.0	
CP-02-028	02CW02800701XF	7	Water		ND	1.0	
CP-02-028	02CW02801401XF	14	Water		ND	1.0	
CP-02-028	02CW02802001XF	20	Water	C-1,2-Dichloroethene	1,500	100.0	
CP-02-029	02CW02901601XF	16	Water	C-1,2-Dichioroediene	ND	1.0	
CP-02-030	02CW03000701XF	7	Water	Trichloroethene	2.5	1.0	J5
CP-02-030	02CW03000701XF	15	Water	C-1,2-Dichloroethene	2.3	1.0	J1J5
CP-02-031	02CW03100801XF	8	Water	Trichloroethene	11	1.0	1112
CP-02-031	02CW03100801XF	14	Water	Trichloroethene	420	100.0	J5
CP-02-031	02CW03101901XF	19	Water	Themoroediene	ND ND	1.0	- 35
CP-02-031	02CW03200801XF	8	Water		ND	1.0	
CP-02-032	02CW03200301XF	17	Water	Trichloroethene	23	1.0	
CP-02-032	02CW03201701XF	26	Water	1 richioroeulene			
			Water	**	ND	1.0	
CP-02-033 CP-02-033	02CW03302001XF 02CW03303001XF	30	Water		ND ND	1.0	
CP-02-033	02CW03303001XF		-		ND	1.0	
		42	Water		ND ND	1.0	
CP-02-034	02CW03403701XF	37	Water		ND	1.0	
CP-02-034	02CW03405001XF	50	Water	Dance	ND	1.0	
CP-02-035	02CW03501601XF	16	Water	Benzene	5.6	1.0	J1
CP-02-035	02CW03502901XF	29	Water	Benzene	1.4	1.0	J1J5
CP-02-035		29		m/p-Xylene	2.1	1.0	J5
CP-02-035	0000000000000	29	384	Vinyl Chloride	43	1.0	
CP-02-035	02CW03504001XF	40	Water	Vinyl Chloride	35	1.0	
CP-02-036	02CW03602201XF	22	Water	Benzene	9.3	1.0	J1
CP-02-036	02CW03603201XF	32	Water	Benzene	2.6	1.0	J1J5
CP-02-036		32		Ethylbenzene	1.4	1.0	J5
CP-02-036	00 000000000000000000000000000000000000	32		Vinyl Chloride	13	1.0	J5
CP-02-036	02CW03604201XF	42	Water		ND	1.0	
CP-02-037	02CW03701001XF	10	Water		ND	1.0	
CP-02-037	02CW03702001XF	20	Water		ND	1.0	
CP-02-037	02CW03703201XF	32	Water		ND	1.0	
CP-02-038	02CW03804301XF	43	Water		ND	1.0	
CP-02-039	02CW03902001XF	20	Water	C-1,2-Dichloroethene	500	20.0	J1
CP-02-039		20		Trichloroethene	30	20.0	

		· *

DATA QUALIFIER DEFINITIONS

QUALIFIER

DEFINITION

Qualifiers for Organic Data

- J Indicates an estimated concentration because results are either below the contract required detection level (CRQL) or quality control criteria were not met.
- Validation qualifier for concentrations below the CRQL.
- U Indicates that compound was analyzed but not detected.
- UJ Indicates that quantitation level was estimated because quality control (QC) criteria were not met.
- B Indicates analyte was detected in both the sample and the associated laboratory method blank.
- E Indicates that the analyte concentration exceeded the calibration range of the gas chromatograph/mass spectrograph and that a reanalysis of a diluted sample is required.
- D Indicates that sample concentration was obtained by dilution to bring result within calibration range.
- R Indicates that data is unusable because QC criteria were not met.
- X Laboratory-defined qualifier used to provide additional information not covered by the other qualifiers.

Qualifiers for Inorganic Data

- E The reported concentration is estimated because of the presence of an interference.
- J Indicates an estimated concentration because OC criteria were not met.
- R Indicates that data is unusable because QC criteria were not met.
- M Duplicate precision criteria were not met.
- N Spiked sample recovery not within control limits.
- s The reported concentration was determined by the method of standard additions.
- W Post-digestion spike for furnace atomic adsorption analysis is outside control limits.
- Concentration reported is below CRQL.
- Duplicate analysis not within control limits.
- + Correlation coefficient for the method of standard additions was less than 0.995

Other Notations

- NR Analysis not requested.
- NA Analysis requested but not performed.
- Compound analyzed but not detected.

SUMMARY TABLES

PHASE I REMEDIAL INVESTIGATION

Summary Table

SAMPLE ID:	D: 01MU101XXX02XX R: 241230 D: 01/17/89 1.: 01/18/89 D: 01/18/89 X: Water	01MM102XXX02XX 24,1252 01,117,89 01,25,89 Uater	01MJ03XXX02XX 241648RE 01/18/89 01/29/89 01/29/89	01MJ104xxx02xx 241226 01/17/89 01/18/89 01/18/89 Water	01MJ105XXX02XX 241649 01/18/89 01/27/89 Mater	01MJ106XXX02XX 241242 01/17/89 01/19/89 Mater	01MJ07XXX02XX 241254 01/17/89 01/25/89 Water	01HU126XXX02XX 24.1253 01/17/89 01/25/89 01/25/89 Water
VOLATILE ORGANIC COMPOUNDS Units: Ug/L	CRDL							
	;		1	•	ā	•	•	0
Chloromethane		0 (•	•	•	•
Bromomethane		•	•	•	•	•	•	•
Vinyl Chloride	-	•	6	• •	•	e	•	a
Chloroethane	• •		s • (• •	•	•	•	•
Methylene Chloride	· •	•	. 6	•		•	•	•
Acetone	2 4	•	•	•	8	•	•	•
Carbon Disurtion		6	•	•	•	•	•	•
	·	8	•	•	•			
1.2-Dichloroethene (total)		•	6	•	•	3200	•	•
Chloroform		8	a	6 (• •	• •	• •	•
1,2-Dichloroethane	•	-	•	r 92		•	OF 069	38 J
2-Butanone	2 "	9 10 10			•	•	•	•
1,1,1-Irichloroetnane			•	•	•	•	•	•
Carpor refraction of	, 2	•	•	•	•	•	•	•
Broadich promethere		•	•	•	•	•	s	•
1.2-Dichloropropane		e		•	•	•	•	• •
cis-1,3-Dichloropropene	•		•	•	•	o (• 0	150
Trichloroethene	,	•	•	•	•	o e	•	3 '
Dibromochloromethane		a	•	• (. (• •	•	•
1,1,2-Trichloroethane		•	• •		•	•	•	•
Benzene	· ·	•		•	•	•	•	•
Trans-1, 3-Dichloroproperie		•	•	•	•	•	•	•
4-Methyl-2-Bentanone		•	•	•	•	•	•	•
2-Hexanone		•	•		•	•	•	g (
Tetrachloroethene		•	•	•	•	8	• •	• •
1,1,2,2-Tetrachloroethane		e		•	•	. 000	1 10	•
Toluene		•	f 00%	• •		0061		•
Chlorobenzene	•	• •	RKO .I	•	026 Y	1400	70 S	•
Ethylbenzene		•		•		•	•	
Styrene Xylenes (Total)		•	13000 1	•	1800 J	9300	110 J	•
				•	• `	30.4	-	•
Dilution Factor	-	geo	125	-	6.0	<u> </u>	-	-
Laboratory Method Blank Associated Equipment Blank Associated Irip Blank	C8890118811 00S8205XXX02XX 0018105XXX	CCB90124823 0058205XXX02XX* 0081105XXX02XX	CBB90128A09 00SB206XX02XX 00BT106XX02XX	CBB90118B11 00SB205XXX02XX 00TB105XXX02XX	CDB90127C09 00SB206XXX02XX 00B1106XXX02XX	CBB90119C23 00SB205XXX02XX* 00B1105XXX02XX	CC890124823 00SB205XXX02XX* 00BT105XXX02XX	CC890124823 00S8205XXX02XX 008T105XXX02XX
Associated Field Blanks	XXIOXXXIOOHHOO	UUMHUU IXXXU IXX	,	-	,	-	•	6

Summary Table

SAMPLE ID: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.: DATE SAMPLE ANALYZED: MATRIX:	D: 01MV127XXX02XX R: 241651 D: 01/18/89 V: 01/28/89 D: 01/28/89 X: Water	01MJ301XXX01XX 241653 01/18/89 01/23/89 01/23/89	01MV304XXX01XX 241654 01/1899 01/27/89 01/27/89	01M/306xxx01xx 241238 01/17/89 01/19/89 01/19/89	01MJ307XXX01XX 241246 01/17/89 01/24/89 01/24/89 Water	01MV307XXX01XD 241250 01/17/89 01/24/89 01/24/89 Water	01MJ308XXX01XX 241251 01/17/89 01/24/89 01/24/89	01MV309XXX01XX 241655 01/18/89 01/23/89 01/23/89 Water
VOLATILE ORGANIC COMPOUNDS UNITS: ug/L	ا _ا							
Chloromethane		•	•	•	•	•	•	•
		•	•	•	•	•	•	•
ę p	. 01	•	•	•	•	•	•	•
	- -	•	•	•	•	•	•	•
ne Chloride	٠ •	•	•	•	•	•	•	•
	0	• 1	•	• •	• (• 1	• •	1 . (
Carbon Disultide			•	•		•	•	•
		•	•	•	•		•	•
(total)	,	1000 D	7300	•	•	•	270	0099
	د د	•	•	•	•	•	•	•
roethane	. 440 .	. 5		. "	, •			, •
1.1.1-Trich(oroethane		3 .	• •	•		•	•	
loride		•	•	•	•	•	•	•
	٠ و		•	•	•	•	•	•
Bromodichloromethane 1 2-6 (chloromethane	· ·	0 4	• •	• •	• •		• •	• •
		•	•	•	•	•	•	•
Trichloroethene	5 85	390 D	•	•	2300	2500	•	•
			•	•	•	•	•	•
richloroethane		• 6	0	•	•	•	• •	•
Benzene Transat Zahichi proprogene		oc °	o s	• 4		• •	٠ و	• •
		•	. •	•	•	•	•	•
2-Pentanone		a	•	•	•	•	٠	•
		•	•	•	•	•	•	•
	٠.	•	•	•	•	•	•	•
-Tetrachloroethane		٠ ٤	100	•	•	•	•	• • • •
/oluene		\$ '	7 00/1	• •	• •	• •		040
	,	7	850 J	•	•	•	23	240
		•	•	•	•	•	•	•
Xylenes (Total)	•	37	3000	•	•	•	28	1800
Dilution factor	3.3	-	20	-	14	14	1.5	20
Laboratory Method Blank Associated Equipment Blank Associated Trip Blank	CB890128A09 00SB206XXX02XX 00BT106XXX02XX	CBB90123A09 00SB206XXX02XX 00B1106XXX02XX	CD890127C09 00SB206XXX02XX 00B1106XXX02XX	CBB90118B11 00SB205XXX02XX* 001B105XXX02XX	CBB90124C23 00SB205XXX02XX* 00BT105XXX02XX	CBB90124A23 00SB205XXX02XX* 00B1105XXX02XX	CBB90124A23 00SB205XXX02XX* 00B1105XXX02XX	CBB90123C12 00SB206XXX02XX 00B1106XXX02XX
Associated Field Blanks	00МН001ХХХ01ХХ	00MH001XX	00MH001XXX01XX	00мн001ххх01хх	00MH001XXX01XX			00MH001XXX01XX

^{* =} Held for analysis.

Summary Table

E GRGANIC CORPOLADOS A. Carrollos CRDL Total 10	10 10 10 10 10 10 10 10	DATE SAMPLE ANALYZED: MATRIX:	ALYZED: 01/28/89 MATRIX: Water	Vater	01/16/89 01/16/89 Water	01/12/89 01/16/89 01/16/89 Water	01/18/89 01/18/89 Water	01/19/89 01/19/89 Water	01/27/89 01/27/89 Water	01/12/89 01/12/89 Water
total) 5 7800 7200 5 58 20 (4300 control of the con	total) 10 11 11 11 11 11 11 1	ORGANIC COMPOUNDS	CRDL							
total) 5 7800 7200 D 58 20 4300 ane 5 7200 D 58 20 4300 charter 5 7200 D 58 20 4300 chart 6 7200 D 58 20 4300 chart 6 7200 D 58 20 4300 chart 6 7200 D 58 20 4300 chart 6 7200 D 58 20 4300 chart 6 7200 D 7200 D 58 70 D 7200 D 720 chart 6 7200 D 7200 D 7200 D 720 chart 6 7200 D 7200 D 7200 D 720 chart 6 7200 D 7200 D 7200 D 720 chart 6 7200 D 7200	10			•	•	•	•		•	
total) 5 7800 7200 D 58 20 4300 end 10	10	Chloromethane	-	•	•	•	•		•	
total) 5 7800 7200 D 58 20	total) 5 7800 7200 b 58 20	Bromomethane	200		•	•	•	•	•	
total) 5 7800 7200 D 58 20	total) 5 7800 7200 D 58 20 11 11 11 11 11 11 11 11 11 11 11 11 11	Vinyl Chloride	200		•	•	•		•	
total) 5 7800 7200 D 58 20	total) 5 7200 5 58 20	Chloroethane	2	•		•	•	•	•	
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total) 5 7800 7200 D 58 20	total)	Acetone	2"	•	•	a	•	•	•	
total) 5 7800 7200 D 58 20	10	Carbon Disultide	n 4	•	•		•	•	•	
total) 5 7800 7200 58 20 e 5 f 6 f 7200 0 58 20 e 730 J R R 35 J 20 J 20 J 20 J 20 J 20 J 20 J 20 J 2	10	1,1-Dichloroethene		0	•		•	•	• !	
e 5	e 5 5 1 230 J R 230 J R 75 J 20 J 20 J 20 J 20 J 20 J 20 J 20 J 2	1,1-Dichloroethane			58	07	•	•	4300	
e 5	e 5 6 7 7 8 7 5 9 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Chloroform		•	•	•	•	•	•	
10 R 230 J R 55 J C0 J C0 J C0 J C0 J C0 J C0 J C0 J	10 R 230 J R 55 J C C C C C C C C C C C C C C C C C	1.2-Dichloroethane		•	•	•	• •	٠ ,		
Perior 5 5	10 10 15 10 28 10 28 10 28 10 10 28 10 10 10 10 10 10 10 1	2-Butanone		230 J	œ	×	ר כנ	3		
hane 5 5 10 J 250	10 10 10 10 10 10 10 10	1,1,1-Trichloroethane		•	•	• •	•	•	•	
10 26 260	10 10 10 10 10 10 10 10	Carbon Tetrachloride		• •	•	•	•	•	•	
S S S S S S S S S S	S S S S S S S S S S	Vinyl Acetate		• •		•	•	•	•	
S	15 10 28	Bromodichloromethane	n (•	•	•	•	•	•	
10 28 10 260 10 28 10 28 10 28 10 28 10 28 10 28 10 28 10 28 10 28 10 28 10 28 260 28 28 260 28 28 260 28 250	15 10 28	1 2-Dichloropropane			•	•	•	•		
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thane 5 5 - 260	thane			•	•	•	•	•	•	
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trachloroethane 5	trachloroethane	2-Hexanone		•	•	đ	•		•	
\$ 310 J 460	\$ 310 J 460	Tetrachloroethene		•	•	•	•	•	•	
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5 2600 J 1000 - 6 13 50 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	S 2600 J 1000 - 6 13 50 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Ethylbenzene	510	520	•	•	•	•	•	
5 COULT 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SO 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Styrene	, 0076	• 000	• •		• • •	5	F 0005	
50 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	od Blank CBB9012BA09 CCB90116C11 CBB90116A09 CBB9011BB11 CBB9011BB11 pment Blank 00SB206XXX02XX 00SB206XXX02XX 00SB205XXX02XX 00SB205XXX02XX blank 00B1106XXX02XX 00SB106XXX02XX 00TB105XXX02XX 00TB105XXX02XX d Blank 00HH001XXX01XX 00HH001XXX01XX 00HH001XXX01XX 00HH001XXX01XX	Xylenes (Total)	0007	200			•			
od Blank CB890128A09 CB890123A09 CC890116C11 CB890116A09 CB890118B11 CB890118B	od Blank CB890128A09 CB890123A09 CC890116C11 CB890116A09 CB890118B11 CB89011BB11 PP CB89011BB11 CB89011B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11B11 CB89011B11 11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11 CB89011B11B11B11 CB89011B11B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11 CB89011B11B1 CB89011B11 CB89011B11 CB89011B11 CB89011B11 CB89011B11B11 CB89011B11 CB89011B11B11 CB89011B1	Dilution Factor	20	0	-	-	-	-	28	
Method Blank CBB901128A09 CBB90116C11 CBB90116A09 CBB90118B11 CBB90118B11 Equipment Blank 00SB206XXX02XX 00SB206XXX02XX 00SB206XXX02XX 00SB205XXX02XX Trin Blank 00B1106XXX02XX 00B1106XXX02XX 00B1106XXX02XX 00TB105XXX02XX	Method Blank CBB90128A09 CBB90116C11 CBB90116A09 CBB90118B11 CBB90118B11 Equipment Blank 00SB206xxx02xx 00SB206xxx02xx 00SB206xxx02xx 00SB205xxx02xx 00SB205xxx02xx Trip Blank 00B1106xxx02xx 00B1106xxx02xx 00B1105xxx02xx 00B1105xxx02xx 00B1005xxx02xx Field Blanks 00MH001xxx01xx 00MH001xxx01xx 00MH001xxx01xx 00MH001xxx01xx									
THE TALL MALINE AND AND AND AND AND AND AND AND AND AND	Field Blanks COMMODIXXXOIXX COMMODIXXXOIXX COMMODIXXXOIXX COMISSION COMMODIXXXOIXX COMMODIXXXOIXX		CBB90128A09 00SB206XXX02XX 00BT106XXX02XX		0058204XXX02XX 0018104XXX02XX	CBB90116A09 00SB203XXX02XX 00BT103XXX02XX	CB890118B11 00SB205XXX02XX* 00TB105XXX02XX	CB890118B11 00SB205XXX02XX* 00TB105XXX02XX	CD890127C09 00SB206XXX02XX 00BT106XXX02XX	

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Summary Table

FINDLE	In. Olwystzxxxotxx	O1MU318XXX01XX	01MU319XXX01XX	01MU319XXX01XD	01MU336XXX01XX	01MJ337XX01XX
I AR NIMB	FR: 239995	241659	241663	241664	241665	241672
DATE CAMPI	ED: 01/11/89	01/18/89	01/18/89	01/18/89	01/18/89	01/18/89
DATE CANDIE OBE	01/11/80	01/27/80	01/23/89	01/23/89	01/23/89	01/20/89
DATE CANDIF ANALYZ	FO: 01/13/89	01/27/89	01/23/89	01/23/89	01/23/89	01/20/89
MATRIX:	IX: Water	Water	Water	Vater	Water	Water

VOLATILE ORGANIC COMPOUNDS UNITS: ug/L

Chloromethane Bromcmethane Vinyl Chloride Chloroethane Chloroethane Carbon Disulfide 1,1-Dichloroethane 1,2-Dichloroethane Chloroethane Chloroform Chloroethane Chloroethane Chloroethane Chloroethane Chloroethane Chloroethane Chloroethane Chloroethane Chloroethane	0000 00 00 00 00 00 00 00 00 00 00 00 0	0300 0000 0000 0000				130
1, 1, 1-trichloroethane Carbon Tetrachloride Vinyl Acetate		4 4 6 4				
bromochiororororororororororororororororororor	าเกเกเกเกเกเก	• • • • • • • • • • • • • • • • • • •				
Trans-1,3-Dichloropropene Bromoform 4-Methyl-2-Pentanone 2-Mexanone Tetrachloroethane 1,1,2,2-Tetrachloroethane Chlorobenzene Ethylbenzene Styrene	ເພພຣີຣົພພພພພພພພ 	t 004 c 076 c 076	• • • • • • • • • • • • • • • • • • • •			
Dilution Factor Laboratory Method Blank Associated Equipment Blank Associated Trip Blank Associated Field Blanks	1 CB890112B11 00SB202XXX02XX 00BT102XXX02XX 00MH001XXX01XX	1 CD890127CO9 0058206xxx02xx 0081106xxx02xx 00HH001xxx01xx	1 CBB90123A09 0058206XXX02XX 0081106XXX02XX	1 CBB90123A09 005B206xxx02xx 00B1106xxx02xx 00HH001xxx01xx	1.3 C8890123C12 00SB206XXX0 00B1106XXX0	1.3 CBB90123C12 00SB206XXX02XX 00BT106XXX02XX

^{* =} Held for analysis.

Summary Table

X
01MV310xxx01X) 241695 01/18/89 Water
01MJ309XXX01XD 241701 01/18/89 Water
01MU309XXX01XX 241694 01/18/89 Water
01MJ307XXX01XX 241216 01/17/89 Water
01MU127XXX02XX 241692 01/18/89 Water
SAMPLE 10: LAB NUMBER: DATE SAMPLED: MATRIX:

METHOD 8010 VOLATILE ORGANIC COMPOUNDS UNITS: Ug/L	TO SOL						
		,	•	•	•	6	•
Chloromethane		•		•	•	•	•
Bromomethane	0.0	•	1	•	•		•
Vinyl Chloride	0.5	•	•	, (٠	•	•
hloroethane	0.5	•	•		. 4	1, 082	•
Merhylene Chloride	-	•	6	9	. 1		•
1-Dichloroethene	0.3	•	•	0	5	•	•
1-Dichloroethane	7.0	•	•	•	•		•
2-Dichloroethene (total)	0.5	8.6	7.6	•	6	000	•
horoform	0.5	•	8.0	0	•	007	•
2-Dichloroethane	0.3	•	•	•	•		1
A COLUMN CONTRACTOR	~	•	•		•	•	ı
יו, ובונונווסוספרושוא		•	•	•	C	•	•
Carbon Tetrachioride		(•	•	•	•	•
Bromodich Loromethane	3.0	•	. (•	•	•	•
.2-Dichloropropane	0.2	•	•	4	•	•	•
1 s-1,3-0 ichioropropene	0.3	• ;	• 6	,	•	•	100
Trichloroethene	0.5	100	00%1	•	•		!
ibromochloromethane	0.2	•	•		•	•	•
1.1.2-Trichloroethane	0.5	•	•	•		•	•
rene-1 3-Dichloropropene	0.5	•	•	•	١.	4	•
2.chlocoethylyinylether	7.0		•	•	•	•	•
	5	•	•	•	•	•)
	7		•	•	•	•	•
ו'ו'ל'ל-ופרושכוווסו ספרוומיום		•	20	•	•	•	•
Tetrachloroethene		•	•	•	•	•	•
Chlorobenzene	4.0		4	•	•	•	•
1,3 Dichlorobenzene	7.0	•	? '	•	•	•	•
1,2 Dichlorobenzene	0.2		•	•	•	•	•
1,4 Dichlorobenzene	0.2	• ;		77	V.	¥¥	¥
Freon 113	_	¥	0.0	Ę	Ē		
Dilution Factor		20	•	200	200	200	50
Laboratory Method Blank		P17803		R04023	R04023 R04023 R04024 R04024	R04023	R04023
Associated Equipment Blank		OOSBZOGXXXUZXX	UUSBEUSXXXUEXX	COSBECCOAAACEAA			

Summary Table

SAMPLE 1D: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.: DATE SAMPLE ANALYZED: MATRIX:	P 000		01M102XXX02XX 241252 01/17/89 01/19/89 01/27/89	01MU103XXX02XX 241648 01/18/89 01/27/89 01/31/89 Water	01HU104XXX02XX 241226 01/17/89 01/19/89 01/27/89	01MW105xxx02xx 241649 01/18/89 01/23/89 01/27/89	01MV106XXX02XX 241242 01/17/89 01/19/89 02/08/89 Water	01HW107XXX02XX 241254 01/17/89 01/19/89 01/27/89 Water	01Mu126xxx02xx 241253 01/17/89 01/19/89 01/27/89 Water
SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: UB/L CRD	NDS CRDL								
	9	a	•	•	•	•	•	•	
his/2-chloroethyllether	200	•	•	•	•	•	•	•	•
2-chlorophenol	2	•	•	•	•	•	•		
1,3-Dichlorobenzene	2	•	•	•		•	•	•	•
1,4-Dichlorobenzene	9	0	•	•	•	•	•	•	•
Benzyl alcohol	9		0	•		•	•	•	•
1,2-Dichlorobenzene	2	•	•	1200 J		•	•	•	•
2-Methylphenol	2		g	•	•	•	•	•	•
bis(2-chlorofsopropyl)ether	2	•	•	•	•	•	•		•
4-Hethylphenol	5	•	9	•	•	•	•	•	•
N-Nitroso-di-n-propylamine	2	•	•	0	•	•	•	•	•
Hexachloroethane	2	•	•	•	•	•	0	•	•
Witrobenzene	2	•			•	•	•		•
Isophorone	2		•	•	•	•	•	•	•
2-Nitrophenol	9	•	•	6	•	•	•	•	•
2,4-Dimethylphenol	2		6	•	•	•	•	•	•
Benzoic acid	20		•	•	•	•	•	• •	
bis(2-Chloroethoxy)methane	2:	ı	•	•	•	•	•	•	
2,4-Dichlorophenol	2	٥	•	•		•	•	•	•
1,2,4-Trichlorobenzene	29	•	•	1.007.1	•	۰ د	1 070		•
Naphthalene	25	•	s .	ב ממינ	•	63	2	•	•
4-chloroaniline	2:	•	•	1	1 1	1	•	•	•
Hexacholorobutadiene	25	•	•	. (• •		•	•	•
4-Chloro-3-Hethylphenol	2;	•	•			• •	1 0000	*	•
2-Methylnaphthalene	29		•	7 0006	• 1	= '	7 0007	<u>:</u> '	•
Hexach lorocyclopentadiene	2:		•		•	,		,	1
2,4,6-Trichlorophenol	10	•	•	•		•	•	•	
2,4,5-Trichlorophenot	20		•	•	•	•	•	•	•
2-Chloronaphthalene	2		•		•	•	•	•	
2-Nitroaniline	20		•	•	•	•	•	•	
Dimethylphthalate	2	•	•	•	•	•	•	•	•
Acenaphthylene	0		•	•	•	•	•	•	
2,6-Dinitrotoluene	10	•	•	•	•	•	•	•	•

Summary Table

SAMPLE 10: LAB NUMBER: DATE SAMPLE PREP.: DATE SAMPLE PREP.:	10: 01HW101XXX02XX 241230 241230 1ED: 01/17/89 EP: 01/19/89 EF: 01/27/89		01MJ102XXX02XX 241252 01/17/89 01/19/89 01/27/89	01MJ103XXX02XX 241648 01/18/89 01/27/89 01/31/89	01MJ104XXX02XX 241226 01/17/89 01/19/89 01/27/89	01HJ105XXX02XX 241649 01/18/89 01/23/89 01/27/89	01MJ106XXX02XX 241242 01/17/89 01/19/89 02/08/89	01MJ107XXX02XX 241254 01/17/89 01/19/89 01/27/89	01MJ126XXX02XX 241253 01/17/89 01/19/89 01/27/89
MATRIX SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: ug/L		٤	Vater	Water	Hater	Water	Water	Water	Vater
	;				,		•	•	•
3-Hitrogniline	20		•	. 044	• •		. •	•	•
Acenaphthene	2	•		7 00	•		•	•	•
2,4-Dinitrophenol	22	1	•	• (•	•	•
4-Nitrophenol	2 5			•	•	•	•	•	•
Dibenzoturan	2 \$			•	•	•	•	•	•
2.4-binitrotoluene	25		•		•	•		•	•
Uletnyiphthalate	2 5	. •	6	•	•	•	•	•	•
4-chlorophicnyl-phenylether	25		•	•	6	•	•		•
	2 5	•		•	•	•	٠	•	•
A-MILLOGIII LIING	25		٠	•	•	•	•	•	•
A D-DIMICIO-K-MACING DISTOR	35		•	•	e	•	•	•	•
	25		•	•	•	•	•	•	•
Hexach Ocobenzena	2 9		0	e	•	•	•	•	•
Destach prophenol	20		•	•	•	•	•	•	•
Phenanthrena	2	•	•	1700 J	•	•	•	•	•
Anthracens	9		•	•	•	•	•	•	•
Di-n-butylphthelate	9	•	•	•	6	•	•	•	•
Fluoranthene	9		G	o	•	•	•		•
Pyrene	2		c	•	6	•	•	•	•
Butylbenzylphthalate	2		9	•	•	•	•	•	•
3.3'-Dichlorobenzidine	50	•	•	•	•	•	•	•	•
Benzo(a)Anthracene	9	•	•		•		•	•	•
Chrysene	9		•	• ;	•	•	•	•	•
bis(2-Ethylhexyl)phthalate	9			1100 7	•	•	•	•	• •
Di-n-octylphthalate	9		•	•	•	•	•	•	• .
Benzo(b)fluoranthene	9	•		•	•	•	•		•
Benzo(k) Fluoranthene	£		6	•	•	•	•	•	•
Benzo(a)Pyrene	Q	•	•	•	•	•	•	•	•
Indeno(1,2,3-cd)pyrene	2		•	•	•	•	•		•
Oibenz(a,h)anthracene	10	,	6	•	•	•	•	•	•
Benzo(g,h,i,)perylene	10		•			•	•	•	•
Dilution Factor			-	2	-	-	e 0	-	-
Laboratory Method Blank Associated Equipment Blank Associated Field Blanks	GJ04262C15 00SB205XXX02XX* 00HH001XXX01XX		GH041353A16 ODSB205XXX02XX* OOMHO01XXX01XX	G3J42983C15 00SB206XXX02XX 00MH001XXX01XX	GJ04262C15 00SB205XXX02XX 00MH001XXX01XX	GH042079C16 00SB206XX02XX 00MH001XXX01XX	GH041353A16 0058205XXX02XX 00MH001XXX01XX	GH041353A16 00SB205XXX02XX 00MH001XXX01XX	GHU41353A16 00SB205XXX02XX 00MH001XXX01XX
	•					•	•		

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LAS MUNICE CONTROL STATES AND CO	SAMPLE DATE SAMPLE DIT OFFICE DITAGOSCANCOTIXX OFFICE DATE SAMPLE DATE SAM	אמווויםו ל ושחום									
\$5 ug/L Chlorochaus \$5 ug/L Chlorochaus Chlorocharene (hlorocharene Alcohorocharene -volatile Organic Compounds S: ug/L Chloroethyl)ether 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 vichenol	DAT	SAMPLE 10: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.: E SAMPLE ANALYZED: HATRIX:	01MV127XXX02XX 241651 01/18/89 01/23/89 01/26/89 Water	01MU301XXX01XX 241653 01/18/89 01/23/89 01/26/89 Water		01MJ36KXX01XX 241238 01/17/89 01/19/89 01/27/89 Water	01MJ307XXX01XX 241246 01/17/89 01/19/89 01/27/89 Water	01MJ307XXX01XD 241250 01/17/89 01/19/89 01/27/89 Water	Ē	01MV309XXX 24165 01/18/8 02/04/8 02/26/8 Wate	
Cition cotive) Jether 10 Cition cotive) Jether 10 Cition cotive) Jether 10 A condition of the condition o	chloroethyl)ether 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorofesopropyl)ether 10 ichlorofesopropylamine 10 ichlorofesopropylamine 10 ichlorofesopropylamine 10 ichlorothane 10 ichlorophenol 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorobenzene 10 ichlorophenol 10 irichlorophenol 10 i	SEMI-VOLATILE UNITS: Ug/L	ORGANIC COMPOUNDS CRDL								
Chloroethyl)ether 10 repotential repotenti	chloroethyl)ether 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 chlorobenzene 10 chloroisopropyl)ether 10 chloroisopropyl)ether 10 chloroisopropyl)ether 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chloroisopropyl mine 10 chlorophenol 10 chlorophe	Jones	ţ,	•	•	10	•	•	•	œ	•
Visither 10	wether 10	hier2-Chloroethy		ø	•	•	•		•	•	•
## mathem	wether 10	2-Chlorophenol		•	0	•	•	•	•	∝	•
wether 10 79 J Vlamine 10 79 J Method 10 79	wt) ether 10	1 3-Dichlorobenz	•		q	•	•	•	•	•	•
		1 4-Dichlorobenz		•	0	•	•	•	•	•	•
	200000000000000000000000000000000000000	Renay Alcohol	•	•	•	•	•	•	•	•	•
		1 2-0 fchlorobenz		•	0	•	•		•	•	•
		2-Hethylphenol		•	•	•	•	•	•	~	9
		hie (2-Chlorofaco	•	•	•	•	•	•	•		•
20000000000000000000000000000000000000		4-Methylphenol		•	•	£ 62	•	•	•	~	26
		N-Nitroso-di-n-n			•	•	•	•	•	•	•
if and the figure of the figur	than the state of	Hexachloroethane	•	•		•	•	•	•	•	•
ithane 50 10 10 10 10 10 10 10 10 10 1	Ithane 100 100 100 100 100 100 100 100 100 10	Mitrobenzene		•	9	•	•	•	•	•	•
ithane 100	ithane 50 to 10 to	I contono	10	•	•	•	•	•	•		•
thank 100	ithane 50 10 10 10 10 10 10 10 10 10 10 10 10 10	2-Witrophenol	101	•	•	•	•	•	•	~	•
Tiene 10 10 10 10 10 10 10 10 10 10 10 10 10	if ene 10	2 4-Dimethylphen		•	•	33	0	•	•	e	33
ithane 10 out 100 if ene 10 if	rthane 10	Benzole acid		•	•	•	0	۰	•	•	•
ifene 10	Tene 10 10 10 10 10 10 10 10 10 10 10 10 10	bis(2-Chloroetho	/)methane		•		•	•	•	•	•
Tene 10	Tene 10 10 10 10 10 10 10 10 10 10 10 10 10	2.4-Dichlorophen			•	•	•	•	•	~	•
10 10 10 10 10 10 10 10 10 10 10 10 10 1	15 to 10 10 10 10 10 10 10 10 10 10 10 10 10	1.2.4-Trichlorob)zene		•	•	•	•	•	•	• :
10 1.0 23	10 10 10 10 10 10 10 10 10 10 10 10 10 1	Monthalene			•	84	•	•	•	•	
if end 10	Tene 10 10 10 10 10 10 10 10 10 10 10 10 10	4-Chlorosniline	10		6	•		•	•	•	•
liene 10	ifene 10	Hexachol probutad		•	•	đ	•	•	•	•	•
Mene 10	Mene 10 10 10 10 10 10 10 10 10 10 10 10 10	4-Chloro-3-Methy		•	•	•	•	•	•	~	•
10 10 10 10 10 10 10 10 10 10 10 10 10 1	100 100 100 100 100 100 100 100 100 100	2-Methylnaphthel		•	•	23	•	•	•	•	72
200000000000000000000000000000000000000		Hexach orococlos		•		•	•	•	.•	•	•
200000000000000000000000000000000000000		2 4 ArTrichlorop	2	•	•	•	•	•	•	~	•
		2 4 5-Trichloron		٠	•	•	•	•	•	œ	•
		2-Chloropachthal		•	•	•	•	•	•		•
		2-Witroaniline		•	đ	•	•	•	•	•	•
		Dimethylphthelet		•	•	•	•	•	•	•	•
		According to the second		•	•		•	•	•	•	•
		2 Animitment		•	•	•	•	•	•	•	•

Summary Table

Summery representations								CONTRACTOR OF THE CONTRACTOR O	***************************************
SAMPLE 1D: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP: DATE SAMPLE ANALYZED: MATRIX:		01MJ127XXX02XX 241651 01/18/89 01/23/89 01/26/89 Water	01MJ301XXX01XX 241653 01/18/89 01/23/89 01/26/89	01MJ304XXX01XX 241654 01/18/89 01/23/89 01/26/89	01MJ306XXX01XX 241238 01/17/89 01/19/89 01/27/89	01MASUTXXVUXX 241246 01/17/89 01/27/89 Mater	01/12/02 01/17/89 01/17/89 01/27/89		241655 241655 01/1899 02/04/89 02/26/89 Water
SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: Ug/L	CROL								
	i				•	•	•	•	•
3-Witrosniline	20	•	•	•	•	•	•	•	•
Acenaphthene	2	•	•	•	•	•	•	•	•
2.4-Dinitrophenol	S		•	•	•	•		۵ ۵	•
4-Nitrophenol	20	•	•	•	•	•	•	•	•
Dibenzofuran	2	•	•	•	•	•		•	•
2.4-Dinitrotoluene	2	•	•	•	•	•	•		•
Diethyl Dhithal at	9	•	•	•	•	•	•	•	, ,
A-chi ocophovi - phenylether	2	•	•	•	•	•	•	•	•
	2		•	•	6	•	•		•
	ç	•	•		•	•	•	•	•
4-Withounitine	2	•	•	•	•	•		œ	•
4,6-Dinitro-Z-metnytphenot	2 5	•	•	•	•				•
N-Nitrosogibuenyiamine	2 \$. 1	•	•	•	•		•	•
4-Bramophenyl-phenylether	2 9	•	, ,	•	•	•		•	•
Hexachlorobenzene	25	•	. (•	•			œ	•
Pentachlorophenol	2;	•	• •	•	•	•	•	•	•
Phenanthrene	2:	•	•		•	•	•	•	•
Anthracene	2:	•	•		•	•	•	•	•
Di-n-butylphthalate	2:	•	•	, ,	•	•	•	•	•
Fluoranthene	2:	•	•	•	•	•	•	•	•
Pyrene	2	•	•	•		•	•	•	•
Butylbenzylphthalate	2	•	•	•			•	•	•
3,3'-Dichlorobenzidine	2	•	•	•	•		•	•	•
Benzo(a) Anthracene	2	•	•	•	•	i 1	•	•	
Chrysene	2	•			•	•		•	•
bis(2-Ethylhexyl)phthalate	2	•	•	•	•	•	•	•	•
Di-n-octvlohthalate	2	•	•	•		•			•
Renzo(b)Fluoranthene	2	•	•	•	•	•	•	, ,	•
Renzo(k)Fixoranthene	2	•	•	•	0	•	•	•	• •
Renzo(a)Pyrene	2	•	•	•	•	•	•	•	. •
Indeport 2 3-cd)myrene	9	•	•	•	•	•	•	•	•
Dibon(* h)sochracene	2	•	•	•	•	•	•	•	•
Benzo(g.h.i.) perylene	2	•	•	•	•	•	•	•	•
					•	•	•	•	-
Dilution Factor		-	-	-	(-	_	-	-
300 0 70 40 0	•	CU02070C16	6H042070C16	GH042079C16	GJ04262C15	GH041353A16	GH041353A16		
Associated Equipment Blank Associated Field Blanks	,00	00SB206XXX02XX 00MH001XXX01XX	00SB206XX02XX 00MH001XXX01XX	00SB206XXX02XX 00MH001XXX01XX	005B205XXX02XX* 00MH001XXX01XX	00SB205XXX02XX* 00MH001XXX01XX	OOSBZOSXXXOZXX*	00SB205XXX02XX* 00MH001XXX01XX	00SB206XXX02XX 00MH001XXX01XX
				•				•	

Summary Table

Summary lable								
SAMPLE 10: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.: DATE SAMPLE ANALYZED: MATRIX:	01MW309XXX01XD 241656 01/18/89 01/25/89 01/26/89	01Mu310xxx01xx 241657 01/18/89 01/23/89 01/26/89 Water	01MV311XXX01XX 240573 01/13/89 01/17/89 01/25/89 Water	01MJ312XXX01XX 240457 01/12/89 01/16/89 01/23/89 Water	01MU313XXX01XX 241233 01/17/89 01/19/89 01/27/89	01MJ14XXX01XX 241235 01/17/89 01/19/89 01/27/89 Water	01Mu315xxx01xx 241658 01/18/89 01/23/89 01/26/89 Water	01Mu316xxx01xx 240003 01/12/89 01/13/89 01/22/89 Water
SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: Ug/L	ا ہے							
1		16	•	•	•	•	•	•
hieror		•	•	•	•	•	•	•
		•	•	•	•	•	•	•
nzene		•	•	•	•	•	•	•
		•	•	•	•	•	•	•
_		•	•	•	•	•	•	•
nzene		•	•	•	•	•	• ;	•
	L 01 01	17	•	•	•	•	20	•
merone Jether		•	•	•	•	•	•	•
	r 29	140 J	•	•	•	•	22 J	•
N-Differential Control and De		•	•	•	•	•		•
		•	•	•	•	•	•	•
		•	•	•	•	•	•	•
	,	•	•	•	•	•	•	•
7		0	•	•	•	•	•	•
	20	86	•	•	•		12	•
		•	•	•	•	•	•	•
athoxy)methane		•	•	•	•	•		•
		•	•	•	•	6	•	•
nzene		0	•	•	•	•	• ;	•
	L 14 01	92	•	•	•	•	51	•
lifne	. 0	•	•	•	•	•	•	
diene			•	•	•	•	•	•
2		•	•	•	•	•	• ;	•
	10 24	•	•	ð	•		21	•
adiene	. 01	•	•	•	•	•	•	•
		•	•	•	•	a		•
2.4.5-Trichtorophenol	. 05	•	•	•	•	•	•	•
	. 0	•	•	•	•	•	•	•
	- 09	•	•	•	•	•	•	•
ate		•	•		•	•	•	•
		•		•	•	•	•	•
Dene	e	•	•	•	•	•	•	ı

Summary Table

SAMPLE 1D: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.: DATE SAMPLE ANALYZED: MATRIX:	D: 01MJ309XXX01XD 241656 D: 01/18/89 0: 01/23/89 D: 01/26/89 X: Water	01MJ310XXX01XX 241657 01/18/89 01/23/89 01/26/89 Water	01MJ311XXX01XX 240573 01/13/89 01/17/89 01/25/89	01MJ312XXX01XX 240457 01/12/89 01/16/89 01/23/89	01MJ313XXX01XX 241233 01/17/89 01/19/89 01/27/89	01MJ314XX01XX 241235 01/17/89 01/19/89 01/27/89	01MJ315XXX01XX 241658 01/18/89 01/23/89 01/26/89	01MJ316XXX01XX 24003 01/12/89 01/13/89 01/22/89
SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: Ug/L CRD	NDS							
T-Microsoft fre	20	•		•	•	•	•	•
Acener by the control of the control		•	•	•	•		•	•
2 4-Dinitrophenoi	50	•	•	•	•		•	•
4-Witrochenol	- 20	•	•	•	•	•	•	•
Dibenzofuran		•		•	•		• •	•
2,4-Dinitrotoluene	. 01	•	•	•	•			•
Diethylphthalate	- 01	•		•	• •		•	
4-Chlorophenyl-phenylether	•	•	• 1	• •		•	e	•
Fluorene	- 02	•	•	• •	•	•	•	•
4-Nitrosniline	05.0	•	•		•	•	•	•
4,6-Dinitro-2-methylphenol	00		•	•	•	•	•	•
N-Nitrosodiphenylamine	2\$	•	•	•	•	•	•	
4-Bromophenyl-phenyletimer	2	•	•	•	•	•	•	•
Destech orochenol	. 05	•	•	•	•	•	•	•
Phenophen	10	•	•	•	•		•	•
Anthracene		•	•	•	C	•	•	•
Di-n-butylphthalate		•	•		•	•	•	• •
Fluoranthene	10	•	•	•	•	•	•	•
Pyrene		•	•	•	•	• •	•	•
Butylbenzylphthalate	- 10	•	•	•		•		
3,3'-Dichlorobenzidine	- 50	B	• •	•	•	•	•	•
Benzo(a)Anthracene	2.5	e (• •	• •	•		•	•
Chrysene	2	•	•	•	•	•	74 P	•
Dis(Z-Etnyinexyi)phinalare		•	٥		•	•	•	•
Benzo(b) Fluorenthene		q	•	•	•	•	•	•
Benzo(k) Fluoranthene	10	•	•		•		•	•
Benzo(a)Pyrene		•		•	•	•	•	•
Indeno(1,2,3-cd)byrene		q	6	•	•	•	•	•
Dibenz(a,h)anthracene		•	•	6	•	•	•	
Benzo(g, h, i,)perylene		0		•	6	•	•	
Dilution Factor	-		-	-	-	-	-	-
							740000000000	20070540845
Laboratory Method Blank Associated Equipment Blank Associated Field Blanks	GH042079C16 00SB206XXX02XX 00MH001XXX01XX	GH042079C16 00SB206XXX02XX 00MH001XXX01XX	GH041088A06 00SB205XXX02XX* 00MH001XXX01XX	GH040714A16 00SB203XXX02XX 00MH001XXX01XX 0001201XXX02XX	GJU42621C15 00SB205XXX02XX* 00MH001XXX01XX	GJU42621C15 00SB205XXX02XX* 00MH001XXX01XX	0088206XXX02XX 0088206XXX02XX 0088001XXX01XX	0058202XXX02XX* 00MH001XXX01XX

Summary Table

SAMPLE ID: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP:: DATE SAMPLE ANALYZED:	: 01MW317XXX01XX 239995 1/11/89 1/13/89 1/17/89	01MA318xxx01xx 241659 01/18/89 01/23/89 01/26/89 Water	01MA319XXX01XX 241663 01/18/89 01/23/89 01/26/89 Water	01MV319XXX01XD 241664 01/18/89 01/22/89 01/25/89	01MU336XXX01XX 241665 01/18/89 01/22/89 01/25/89	01MU337XXX01XX 241672 01/12/89 01/22/89 01/25/89
SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: Ug/L	ا د					
		•	•	•	•	•
_ •		•	•	•	•	•
nyt Jetner		•	•	•	•	•
	25	•	•	•	•	
	•	•	•	•	•	•
		•	•	•	•	•
		•	•	•	•	•
2-Mathol phanol		•	•	•	•	•
Jather		•	•	•	•	•
		ø	•	•	•	32 J
- propylamine		9		•	ø	•
		9	•	•		•
		e		•	•	•
		9	•	•	•	•
		•	•	•	•	•
2.4-Dimethylohenol		•	0		•	16 J
	~	•	•	•	•	•
		8	•		•	•
2.4-Dichlorophenol		q	•	•	•	8
		ø	•		•	• !
		•	•	•	•	87
Line		4	•	•	•	•
diene		0		•	•	•
5	. 0	6			•	• (
		0	•	•	•	25
ene		•	•	•	•	•
		•	•	•		•
			•	•	•	•
		•	•	•	•	•
		•	•		•	•
		•	•	•	•	•
Acenaphthylene 1		•	•	•	•	•
		•	•	•	•	

Summary Table

SAMPLE ID: LAB NUMBER: DATE SAMPLED: DATE SAMPLE PREP.:	OTHE	01M/31BXXX01XX 241659 01/18/89 01/23/89	01MJ319XXX01XX 241663 01/18/89 01/23/89	01MJ319XXX01XD 24,1664 01/18/89 01/22/89	01MJ35XXX01XX 241665 01/18/89 01/22/89	01MJ337xx01xx 241672 01/18/89 01/22/89	
DATE SAMPLE ANALTZED: MATRIX:	: 1/11/59 : Vater	UI/20/09 Water	Water	Water	Water	Water	
SEMI-VOLATILE ORGANIC CCMPOUNDS UNITS: Ug/L	ا ب						
		•	•		•	•	
2		•	•	•	•	•	
		•	•		•	•	
. 4-UINITrophenol		•	•	•	•	•	
	,	•	•	•	•	•	
•	,	•	•	•	•	•	
		•	•	•	•	•	
nenviether		•	•	•	•	•	
		•	0	•	•	•	
1100		•	0	•	•	•	
nethylphenol		•	•	•	•	•	
			•	•	•	•	
Jer		•	•	•	•	•	
		•	•	•	•	•	
			•	•	•	• •	
		•	•	•		•	
	•	•	•	•		•	
i-n-butylphthalate		•	0	•		•	
		•		• •	•	•	
		•		•	•	•	
		•		•	•	•	
910		•	•	•	•	•	
Anthracene		•	•	•	•	•	
of a Control between the control of	270 J	•	•	•	•	110	
		•	•		•	•	
senzo(b) Fluoranthene			•	•	•	•	
		•	•	•	•	•	
	. 0	•	•		•	•	
		•	•	•	a 4	•	
	10	• •	σ •	• •	• •		
			•				
Dilution Factor	-	guio	-	-	-	-	
Laboratory Method Blank	GH040243C20	GH042079C16	GH042079C16	GH041933A04 005B206XXX02XX	GH041933A04 00SB206XXX02XX	GH041933A04 00SB206XXX02XX	
Associated Equipment blank Associated Field Blanks	0001201XXX01XX 0001201XXX02XX		00нн001ххх01хх	00MH001XXX01XX	00MH001XXX01XX	ООМНООТХХОТХ	

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S	DATE SAMPLED: DATE SAMPLE PREP.: DATE SAMPLE ANALYZED: MATRIX:	METALS ANALYTICAL UNITS: Ug/L METHOD	Lead P/F	Laboratory Method Blank Associated Equipment Blank Associated Field Blanks
SAMPLE 10: LAB NUMBER:	DATE SAMPLED: SAMPLE PREP.: PLE ANALYZED: MATRIX:	METHOD CRDL	. 5	
SAMPLE 1D: 01MJ101XXX02XX AB NUMBER: 241256	1/1/89 1/23/89 1/23/89 Water		•	15926C 0058205XXX02XX 00HH001XXX01XX 00D1201XXX02XX
01HW102X	1/1/89 1/23/89 1/23/89 Water		•	15926C 00SB205XXX02XX 00MH001XXX01XX 0001201XXX02XX
01MW103XXX02XX 241674	01/20/89 01/20/89 01/25/89 Water		126	15926E 0058206XX02XX 00MH001XXX01XX
01MU104XXX02XX 241255	1/1/69 1/23/89 1/23/89 Water		•	15926C 00SB205XXX02XX 00MH001XXX01XX
01MV105XXX02XX 241680	01/16/69 01/20/89 01/25/89 Water		•	15926E 00SB206XX02XX 00MH001XXX01XX
01MU106XXX02XX 241260	1/23/89 1/23/89 1/23/89 Water		•	15926C 00SB205XXX02XX 00MH001XXX01XX 00D1201XXX02XX
01MU107XXX02XX 241265	1/23/89 1/23/89 1/23/89 Water		•	15926C 00SB205XXX02XX 00MH001XXX01XX 00D1201XXX02XX
01MV126XXX02XX 241264	1/23/89 1/23/89 1/23/89 Water		•	15926C 00SB205XXX02XX 00HH001XXX01XX 00D1201XXX02XX

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01MJ311XXX01XX 240587 1/13/89 1/23/89 1/23/89 Mater		•	15926C 3058204xx02xx 30HH001xxx01xx 30D1201xxx02xx
01MU310XXX01XX 0 241686 01/18/89 01/20/89 01/25/89 Water		•	15926E 00SB206XXX02XX 0 00MH001XXX01XX 0
01MJ309XXX01XD 241685 01/18/89 01/20/89 01/25/89 Hater		q	15926E 0058206XXX02XX 00MH001XXX01XX
01MJ309XXX01XX 241684 01/18/89 01/20/89 01/25/89		•	15926E 0058206XX02XX 00MH001XXX01XX
01MJ308XXX01XX 241262 1/17/89 1/23/89 1/23/89 Water		e e	15926C 0058205XXX02XX 00MH001XXX01XX 00D1201XXX02XX
01MJ307XXX01XX 241261 1/17/89 1/23/89 1/23/89 Water		•	15926C 0058205XXX02XX 00MH001XXX01XX 0001201XXX02XX
01MJ306XXX01XX 241259 1/17/89 1/23/89 1/23/89		¢	15926C 0058205xxx02xx 00MH001xxx01xx 0001201xxx02xx
SAMPLE 1D: 01MM127XXX02XX 8 NUMBER: 241683 E SAMPLED: 01/18/89 PLE PREP.: 01/20/89 ANALYZED: 01/25/89 MATRIX: Water		•	15926E 00SB206XXX02XX 00HHD01XXX01XX
PLE 1D: NUMBER: AMPLED: PREP.: ALYZED: MATRIX:	CRDL	2	
SAMPLE 1D: LAB NUMBER: DATE SAMPLE PREP.: DATE SAMPLE PREP.: DATE SAMPLE MALYZED:	ANALYTICAL HETHOD CRDL	P/F	thod Blank Joment Blank eld Blanks
Summery Table	METALS UNITS: UG/L	Pead	Laboratory Method Blank Associated Equipment Blank Associated Field Blanks

DA METALS UNITS: Ug/L	SAMPLE ID: LAB NUMBER: DATE SAMPLE PREP.: DATE SAMPLE PREP.: AMALYTICAL MATRIX: AMALYTICAL METHOD CROL	PLE 1D: NUMBER: NUMBER: PREP: PREP: ALYZED: MATRIX: AL CRDL	SAMPLE 10: 01MA312XXX01XX AB NUMBER: 240499 E SAMPLED: 1/12/89 PLE PREP: 1/23/89 ANALYZED: 1/23/89 MATRIX: Water HOD CROL	01M4313XXX01XX 0 241257 1/17/89 1/23/89 1/23/89 Water	01M/314xxx01xx 241258 1/17/89 1/23/89 1/23/89 Water	01MJ315XXX01XX 241687 01/18/89 01/25/89 Water 10	01MV316XXX01XX 240045 1/11/89 1/23/89 1/23/89 Water	01Mu317xxx01xx 240040 1/11/89 1/23/89 1/23/89 Water	01M/318xxx01xx 241688 01/18/89 01/20/89 01/25/89 Water	01MJ319XXX01XX 241689 01/18/89 01/25/89 01/25/89
atory Meth fated Equi	Laboratory Method Blank Associated Equipment Blank Associated Field Blanks		15926C 00SB203XXX02XX 00HH001XXX01XX 00D1201XXX02XX	15926C 00SB205XXX02XX 00MH001XXX01XX 0001201XXX02XX	15926C 0058205XXX02XX 00MH001XXX01XX 0001201XXX02XX	15926E 00SB206XXX02XX 00MH001XXX01XX	15926C 00SB202XXX02XX 00MH001XXX01XX 00D1201XXX02XX	15926C 00SB202XXX02XX 00MH001XXX01XX 0001201XXX02XX	15926E 00SB206XXX02XX 00MH001XXX01XX	15926E 00SB206XXX02XX 00MH001XXX01XX

Summary Table

SAMPLE 1D: 01M4319XXX01XD 01M4335XXX01XX LAB NUMBER: 241690 241691 DATE SAMPLED: 01/18/89 01/18/89 DATE SAMPLE PREP.: 01/20/89 01/20/89 DATE SAMPLE ANALYZED: 01/25/89 01/25/89 MATRIX: Water Water

CRDL ANALYTICAL NETHOD (P/F METALS UNITS: ug/L Lead 15926E 15926E 00SB206XXX02XX 00H001XXX01XX 00HH001XXX01XX

Laboratory Method Blank Associated Equipment Blank Associated Field Blanks

Summary Table

				9 02/02/89	
01MJ304XX	24169	01/18/8	01/24/8	02/02/89	Wate
01MJ301XXX01XX	241697	01/18/89	01/24/89	02/02/89	Water
SAMPLE 10:	LAB NUMBER:	DATE SAMPLED:	DATE SAMPLE PREP.:	DATE SAMPLE ANALYZED: 02/02/89	MATRIX:

15926E 15926E 00SB206xxx02xx 00H001xxx01xx 00H001xxx01xx 11200 J 69 15926E 00SB206XX02XX 00MH001XXX01XX 19600 1650 2670 ANALYTICAL METHOD CRDL Laboratory Hethod Blank Associated Equipment Blank Associated Field Blank METALS COMPOUNDS UNITS: ug/L Atuminum Antimony Arsenic Barium Cadmium Calcium Chromium Cobalt Magnesium Manganese Mercury Nickel Potassium Selenium Solver Sodium Thallium Vanadium

16300 J

151

20800

98400

Summary Table

				01/24/89	
D1MV108XXX02XX	241882	01/19/89	01/25/89	01/25/89	Product *
SAMPLE ID:	1 AB MIMBER:	DATE SAMPLED:	NATE CAMPI F DRFP.	DATE SAMPLE ANALYZED:	MATRIX

VOLATILE ORGANIC COMPOUNDS UNITS: Ug/kg CRDL

840000 390000 D 11000000 B000000 D 1800000 D 1600000 B000000 D 1600000 B000000 D 1770 20	CB890125A12 CN04227BB12 00SB207XXX02XX**00SB207XXX02XX** 00B1107XXX02XX 00B1107XXX02XX
Chloromethane Bromomethane Vinyl Chloride Chloroethane Actone Chloroethane 1,1-Dichloroethane 1,2-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,1-Dichloroethane 1,1-Trichloroethane 1,1,1-Trichloroethane 1,1,1-Trichloroethane 1,1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,2-Dichloropropane 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Trichloroethane 1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane	Laboratory Method Blank Associated Equipment Blank Associated Trip Blank

jium level analysis.

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SAMPLE	SAMPLE TO: 01MV108XXX02XX	XX 01MG05XXX01XX	
LAB NUMBER:	ER: 241882		
DATE SAMPLED	••	01/19/89	
DATE SAMPLE PREP.		01/25/89	
DATE SAMPLE ANALYZED	o `	> :	
MATRIX	IX: Product	Froduct	
SEMI-VOLATILE ORGANIC COMPOUNDS	SO		
UNITS: Ug/kg	CRDL		
, and a	330	з	
hierorchioroethyl Jether	330	•	
2-Chlorothenol	330	0	
1.3-Dichiorobenzene	330	•	
1.4-Dichlorobenzene	330 290000	•	
Benzyl alcohol	_		
1,2-Dichlorobenzene	330 1300000	250000	
2-Methylphenol	330	•	
bis(2-Chloroisopropyl)ether	330	0	
4-Methylphenol	330	•	
M-Nitroso-di-n-propylamine	330	đ	
Hexachloroethane	330	•	
	-	,	

-Hethy Duenol	220		
ofs(2-Chlorofsopropyl)ether	330	•	0
-Hethylphenol	330	•	•
I-Nitroso-di-n-propylamine	330	•	8
lexachloroethane	330	•	•
litrobenzene	330	•	a
sophorone	330	•	•
2-Nitrophenol	330	•	
2.4-Dimethylphenol	330	•	•
Senzoic acid	1600	•	•
ofs(2-Chloroethoxy)methane	330	•	•
2.4-Dichiorophenol	330	•	•
1.2.4-Trichtorobenzene	330	•	•
daphthalene	330	1200000	1100000
6-Chloroaniline	330	•	
Mexachol orobut adiene	330		4
4-Chloro-3-Hethylphenol	330	•	•
2-Methylnaphthalene	330	200000	1800000
Hexach lorocyclopentadiene	330	•	•
2.4.6-Trichlorophenol	330	•	8
2.4.5-Trichlorophenol	1600	•	•
2-Chloronaphthalene	330	•	•
2-Nitroaniline	1600	•	•
Dimethylphthalate	330	•	•
Acenaphthylene	330	•	•
2.6-Dinitrotoluene	330	•	•

^{* =} Held for analysis, ** = Medium level analysis.

01MJ305XXX01XX	241880	01/19/89	01/25/89	01/30/89	Product **
01MJ108XXX02XX	241882	01/19/89	01/25/89	01/31/89	Product **
SAMPLE ID: 01MJ108XXX02XX	LAB NUMBER:	DATE SAMPLED:	DATE SAMPLE PREP.:	DATE SAMPLE ANALYZED:	HATRIX:

SEMI-VOLATILE ORGANIC COMPOUNDS UNITS: ug/kg CRDL

•	•	•			•	•	•	•			•		•												•	10 10	G2J42321A04 G2J42321A04 00SB2O7XXX02XX* 00SB207XXX02XX*
- ·		enol	_	Dibenzofuran 330	2,4-Dinitrotoluene 330	Diethylphthelate 330	henylether		methylphenol 1	ř.		Pentachlorophenol 1600	Anthracene 330	Di-n-butyiphthalate 330		Butylbenzyiphthalate 330	3,3'-Dichlorobenzidine 660	M 3	Chrysene 330	thalate 3		Benzo(k) Fluoranthene 330	Indeno(1,2,3-cd)pyrene 330	h)anthracene	Benzo(g,h,i,)perylene 330	Dilution Factor	Laboratory Method Blank Associated Equipment Blank

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1MW108XXX02XX	241888	01/19/89	01/30/89	(ALYZED: 02/01/89 02/01/89	Product
NS	LAB	DATE	DATE SAMPL	DATE SAMPLE ANALYZED:	

METALS UNITS: mg/kg	ANALYTICAL METHOD	CRDL		
		!		
Aluminum	•	3	•	•
Antimony	۵.	12	8	•
Arsenic	L	2	•	•
Barica	٩	9	•	•
Beryllium	۵	-	•	•
Cadmica	a	_	•	•
Calcium	•	1000	•	•
Chromium	۵.	~		•
Cobalt	۵.	2	•	8
Copper	۵.	~	•	3
Iron	۵.	2	117 J	200
Lead	P/F	-	629	587
Magnesfum	۵.	1000	•	•
Hanganese	۵.	m	•	•
Mercury	2	0	•	•
Nickel	۵.	€	•	•
Potassium	٩	1 000	•	•
Selenium	٠.	_	~	
Silver	۵.	~	•	•
Sodium	۵.	1000	•	•
Thatlium	u.	7	•	•
Vanadius	۵.	2	•	•
Zinc	۵	4	207 J	13
Percent Solids			28	22
Laboratory Method Bla Associated Equipment Associated Field Blan	Method Blank Equipment Blank Field Blank		15905C 00SB207XXX02XX 00HH001XXX01XX	15905C 00SB207XXX0 00MH001XXX0

Summary rapice	MU-138	MW-308	MN-309	MW-310	HW-311	MV-312	MV-313	MW-336
LAB NUMBER: DATE SAMPLED: DATE SAMPLED: DATE ANALYZED:	01MJ13802202XX 267483 6/12/89 6/16/89	01MJ30803002xX 267491 6/13/89 6/16/89	01MU30902002XX 267492 6/13/89 6/19/89	01HU31002702XX 267493 6/13/89 6/19/89	01MW311010002XX 267519 6/13/89 6/19/89	01MJ31201602XX 267518 6/13/89 6/19/89	01MU31303502XX 267490 6/12/89 6/16/89	01MU33603502XX 267497 6/13/89 6/16/89
CROL								
10	c	•	•	•	•	•	•	•
200					•	•		•
5	•			•	•	•	•	•
2	•	•	•	•	•	•	•	•
	•	•			•	•	•	•
Methylene unloringe	•	•	•	•		•	•	•
Acetone 10	•	•	•	•		•	•	•
	•	•	•	•		•	•	•
	• •	•	•	•	•	•		•
1-Dichloroethane		200 0	2,600	8500	97	22	•	190
	•	2 '		•	•	•	•	•
		•	•	•	•	•	•	•
, c-Dichloroethane	2	•		•	04	•		78 J
		•		•		•	•	•
ט	•	•	•			•	•	•
Carbon setrachiorsus	•	•	•	•	•	•	•	•
VINYL Acetate	•	•		•	•	•	•	•
	•	•	•	•	•	•	•	•
		•	•	•	•	• !	• 1	• •
Trichlocoethene 5		0	•	•	14	9	20	011
	•		•	•	•	•	•	•
a	•	•	•	• ;	•	•	•	• •
	•	73	750	510	•	•	•	<u> </u>
Trans-1.3-Dichioropropene 5	•	•	•	6	•	•	•	•
	•	•	•	•	•	•	•	0
4-Methyl-2-Pentanone 10	•	•	•	•		•	•	•
	•	•	•	•	•	•	•	•
	•		•	6	•	•	•	•
roethane	•	•		•	•	•	•	•
5	9	•	560	250	•	•	•	
20	•	•	•	•	•	•	•	1
5	•	150	077	340	•		•	•
•		•	•	•	•	•	•	•
5	5	91	1600	1300	•	•	•	•
20					ac	•		
56					•	•		
Dilution Factor:	######################################		3======================================	56	40 56 1 1		:: : : : : : : : : : : : : : : : : : :	
							0000000	0147470000
Associated Method Blank: Associated Equipment Blank: Associated Trip Blank: Associated Field Blank:		CB890616A19 00SB06138902* 00TB06128902 00D106138901	CB890618B19 00SB0613B902* 00TB0612B902 00D106138901	CB890618B19 00SB0613B902* 00TB0612B902 00D10613B901	CBB90618B11 005B0613B902* 001B0612B902 00010613B901	C8890618811 005806138902* 001806128902 000106138901	C6890616419 00S806128901 00T806128902 00D106138901	005806138902* 005806138902* 001806128902 000106138901
	00MH06138901	00MH061589U1	00MH06138901	UUMHU61589U1				

SAMPLE LOCATION: MW-336 DUP SAMPLE 10: 01MW336035020X LAB NUMBER: 267494 DATE SAMPLED: 6/13/89 DATE ANALYZED: 6/19/89

ANALYTE

CR0

Chloromethane	55	, ,
Vinyl Chloride	0;	
Chloroethane	25	
Acetone	5	•
Carbon Disulfide	'n	•
1,1-Dichloroethene	ı,	
ichloroethane	<u>ب</u>	. 656
1,2-Dichloroethene (total)	v i	220
Chloroform	'n	•
1,2-Dichloroethane	n ;	•
2-Butanone	₽'	•
1,1,1.Trichloroethane	ın ı	•
Carbon Tetrachloride	ın ş	•
Vinyl Acetate	<u></u>	•
Bromodichloromethane	ın i	•
1,2-Dichloropropane	ın i	
Cis-1,3-Dichloropropene	ı,	• •
Trichloroethene	ın i	140
Dibromochloromethane	ı,	•
1,1,2-Trichloroethane	nı	• •
Benzene	nı	<u>o</u>
Trans-1,3-Dichloropropene	^ "	•
Bromoform	u ŝ	•
4-Methyl-2-Pentanone	25	•
2-Hexanone	21	•
Tetrachloroethene	Λ,	•
1,1,2,2-Tetrachloroethane	Δi	•
Toluene	•	•
Chlorobenzene	ı, ı	•
Ethylbenzene	^ "	• •
	חו	
Xylenes (Total)	۰ در	•
Acrylonitrile	28	

Dilution Factor: 1.5

Associated Method Blank: CB890618819
Associated Equipment Blank: 005806138902*
Associated Trip Blank: 001806128902
Associated Field Blank: 000106138901

* = Held for analysis.

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Summar)

and a language	anre							
	SAMPLE LOCATION: SAMPLE ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	MW-138 01MU13802202XX 267483 6/12/89 6/15/89	MW-308 01MJ30803002XX 267491 6/13/89 6/20/89	MW-309 01MM30902002XX 267492 6/13/89 6/16/89	MW-310 01MW31002702XX 267493 6/13/89 6/15/89 6/17/89	MW-313 01MW31303502XX 267490 6/12/89 6/15/89 6/16/89	MW-336 01MW33603502XX 267497 6/13/89 6/16/89	MW-336 DUP 01MW33603502DX 267494 6/13/89 6/15/89
ANALYTE	CROL	1						
T uithanailline	0.5	•	•	•	•	•	ŧ	,
3-Nitroaniline	0,0	•	•	•	•	•	•	•
Acerial illerie			•	•	•	•	•	
C. Witrorbend	3.05		•	•	•	•	•	•
Dibonofice	200		•	•	•		•	•
2 4-Dinitrotoluer	10		•	•	•	•	•	•
Diethylchthalate			•	•	•	•	•	
4-Chlorophenyl-phenylether	nvlether	•	•	•	•	•		
Fluorene		•	•	•	•	•	•	•
4-Nitroaniline		•	•	•	•	•	•	
4.6-Dinitro-2-methylphenol		•	•	•	•		•	
N-Nitrosodiphenylamine		•	•	•	•	•	•	
4-Bromophenyl-phenylether		•	•	•	•	•	•	•
Hexach lorobenzene		•	•	•	•		•	•
Pentachlorophenol		•	•	•	•	•	•	•
Phenanthrene		•	•	•	•	•	•	•
Anthracene	10		•	•	•		•	•
Di-n-butylohthalate	ate 10	•	•	•	•	•		
Fluoranthene		•	•		•	•	•	•
Pyrene	10	•	•	•		•	•	
Butylbenzylphthalate		•	•		•	•	•	ı
3.3'-Dichlorobenzidine		•	•	•		•	•	•
Benzo(a) Anthracene	10 10	•			•		•	•
Chrysene		•	•	•	•	•		•
bis(2-Ethylhexyl)ohthalate	•	12		16		=	•	
Di-n-octvlohthalate	ate 10		•	•	•	•	•	•
Benzo(b) Fluoranthene	hene 10		•	•	•	•	•	•
Benzo(k) Fluoranthene	•	•	•	•	•	•	•	•
Benzo(a)Pyrene	10	•	•	•		•	•	
Indeno(1,2,3-cd)pyrene		•	•	•	•	•		•
Dibenz(a,h)anthracene	acene 10	•	•	•	•	•	•	•
Benzo(g,h,i,)perylene		•	•	•			•	

Associated Associated Associated	Associated Method Blank: Associated Equipment Blank: Associated Field Blank:		GH068460A22 00SB06138902* 00D106138901	GH067847A15 00SB06138902* 00D106138901	GH067847A15 00SB0613B902* 00D106138901	GH067847A15 00SB06128901 00D106138901	GH067847A15 00SB06138902* 00D106138901	GH067847A15 00SB06138902* 00D106138901
		UUMHU61589U1	UUMHUO1589U1	UUMHU6158901	UUMHUD1389U1	UUMHUO 1389U I	10765130701	0.0001.0001.000

^{* =} Held for analysis.

PHASE II REMEDIAL INVESTIGATION (FALL 1990 - WINTER 1991)

Summary Table									
	LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	B-02-014 D: 02BW014042010X R: 40569 D: 12/17/90 D: 12/28/90	B-02-014 DX 02BW01404201XX 40570 12/17/90 12/28/90	B-02-015 1XX 02BW01504201XX 40586 12/18/90 12/29/90	B-02-016 1XX 028401604201XX 40674 12/19/90 12/29/90	B-02-017 11xx 028W01704201xx 40677 12/19/90 12/29/90	8-02-019 1xx 028401904501xx 39815 12/10/90 12/18/90	B-02-020 1xx 028402005501xx 39814 12/09/90 12/18/90	MN-02-034 IXX 02NN03404701XX 40650 12/18/90 12/28/90
ANALYTE SOM-02/88	CROL								
*************************		•	4	1	•	•	•	•	•
Chloromethane	29	•	•	•	•	,		1	• 1
Bromomethane	2	•	•	•	a	•	•	•	•
Vinvl Chloride	2	•	•	•	•	•	•	•	•
Chlorothane	9	•	•	•		•	•	•	•
Machal and Chloride	ľ	•	20	•	•	•	•	•	•
שבנוולובות כוונסו ומב	, 5	•	10	•		•	•	•	•
Acetone 6 4 4 5	<u>.</u>	•		•	•	•	•	•	•
Carbon Disultide	.	•	•	•	•		•	•	•
1 - Dichloroethere	v	•	•	•	•	•	•	•	•
1, 1-Dichlorethane	n w	•	•	•	•		97	2600	•
1,2-pichloroethere (total)	·	•	•	•	•	•	•	•	•
	. u	0	•	•	•	•	•	•	•
1,2-Dichloroethane	٠.	•	•	•	•	•	•	•	•
2-Butanone	2 4	. •	•	•	•	•	•	•	•
1, 1, 1-irichioroethane	~ #		•	•	•	•	•		•
Carbon Tetrachloride	nş	•	•	•	. •	•	•	•	•
Vinyl Acetate	24	•	•	•	•	•	•	•	•
Bromodichloromethane	^ •	•	•	•	•	. (. (. (
1,2-Dichloropropane	וח	•	•	•	•	•	•	•	8 1
cis-1,3-Dichloropropene	n	•	•	•	•	•	•	. 000	•
Trichloroethene	'n	•	•	•	•	•	•	7007	• 1
Dibromochloromethane	I	•	•	•	•	•	•	•	
1,1,2-Trichloroethane	ı,	•	•	•	•	•	•	•	•
Benzene	'n	•	•	•	•	•	•	•	•
trans-1,3-Dichloropropene	ı,	•	•	•	•	•	•	•	•
Bromoform	so.	•	•	•	9	•	•	•	•
4-Methyl-2-Pentanone	₽:	•	•	•	•	•	ŧ	•	•
2-Hexanone	2	•	•	•	•	•	•	•	•
Tetrachloroethene	ı,	a	•	0	•	•	•	•	•
1,1,2,2-Tetrachloroethane	ın.	•	•	0	6	•	• ;	•	•
Toluene	'n	•	•	•	•	•	58	1400	•
Chlorobenzene	un.	•	•	•	•	6	•	• [
Ethylbenzene	'n	•	•	•	•	1	36	086	32 X
Styrene	'n	•	•	•	•	•	•	•	•
Total Xylenes	5	•	•	•	•	•	170	7800	89
						01 11 10 10 10 10 10 10 10 10 10 10 10 1	11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11 11	
Dilutia	Dilution Factor:	1.00	1.00	1.00	1.00	1.00	1.00	100	5.00
Associated Method	od Blank:	VBLK53	VBLK53	Y5617	Y5617	Y5617	06690	06691	Y7190
Associated Equipment		• (• •	00qs00700001xx	00as00700001xx	000S00700001XX	• •		00as00700001xx
Associated Fie	Blank:	19 20000 200 200	E ANTOCOCO TO A TO A TO A TO A TO A TO A TO	B ************************************	B ANDOUGHOUS AND CO	8 2200000000000000000000000000000000000	8 2200000000000000000000000000000000000	WATOOCO. COOLOOO	***************************************
Associated inp			VVI 000000001200	VVI 0000 100 IB00	VVI 0000001200	VV 00000001200	VVI 00001001200		VV. 0000 100 100

SITE: FIRE TRAINING AREA

Summery Table

	SAMPLE LOCATION: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	02MU033XXX01XD 42733 # 01/29/91 02/05/91	02Mu033xxx01xx 42732 # 01/29/91 02/04/91	02MU034xxx01xx 42729 # 01/29/91 02/05/91	02MV035XXX01XX 42730 # 01/29/91 02/05/91	02Hu036XXX01XX 42731 # 01/29/91 02/08/91
ANALYTE	CROL					
Chloromethane	10	•	•	•	•	•
Bronomethane	10	•	•	•	•	•
Vinyl Chloride	10	•	•		•	•
Chloroethane	:5	1	•	•	•	
Methylene Chloride	<u>s</u> w	•	•	•	• •	
Academic circulate	1	,			1	Ì
perbon Dienifida	2 4		•	• •	•	•
2-Dicklesophone	٠ ٠		1	1	•	
1,1-Dichlorosthans	.	•	• '	•	•	•
2-Dichlorosthere (total)	n w	2.0	90	• 1	•	•
Chieforoform		3	0,4	•	•	•
3.0.1.01.m	n u		•	•	•	•
1,2-Ulchloroethane	n (•	•	•	•
-Butanone	0,	œ.	oc.	œ	œ	•
, 1, 1-Trichloroethane	'n	•	•		•	•
Carbon Tetrachloride	'n		•		•	•
Vinyl Acetate	10	•	•		•	•
Bromodichloromethane	\$	•	•	•	•	•
,2-Dichloropropane	v		•	•	•	•
is-1,3-Dichloropropene	v	•	•		•	•
Trichloroethene	S	31	37	•		•
Dibromochloromethane	S	•	•	•	•	•
1,1,2-Trichloroethane	5	•	•	•		•
enzene	s		•	•	•	•
trans-1,3-Dichloropropene	S	•	•	•	•	•
romoform	5	•	•		•	•
4-Methyl-2-Pentanone	10			•	•	•
2-Hexanone	10	•	•	•		•
Tetrachloroethene	S	•	•	•	•	•
1,2,2-Tetrachloroethane	S	•	•	•		•
luene	S	23	92	•	•	15
Chlorobenzene	5	•	•	•		•
Ethylbenzene	'n	71	91	•	•	•
Styrene	S		•	•		
Total Xylenes		89	95	•	•	75
				14 15 16 16 16 16 16 16 16 16 16 16 16 16 16		11 M 11 M 11 M 11 M 11 M 11 M 11 M 11
niio	Dilution factor:	2.0	1,0	2.0	2.0	10

Box Number: 6091-224 #: Level D validation

Associated Method Blank:
Associated Equipment Blank:
Associated Field Blank:
Associated Irip Blank:

ACCEST THE TOTAL BASE - 1990 RI Data

		SAMPLE LOCATION: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	02MU033XXX01XD 42739 # 01/29/91 01/31/91 02/13/91	0 02MU033xxx01xx 42738 # 01/29/91 01/31/91 02/13/91	XX O2MU034XXX01XX 42735 # 01/29/91 01/31/91 02/12/91		02MU035XXX01XX 42736 # 01/29/91 01/31/91 02/13/91	02HW036XXX01XX 42737 # 01/29/91 01/31/91	
	ANALYTE	CROL						14/51/50	
3-Witrospiline									
Acamark than	U	000	•	•	•			•	
, of the new	•	01	•	ø	•			•	
c,4-UINITrophenol	enol	20	•	•	•			•	
4-Nitrophenol		20	•	•	•		•	•	
Dibenzofuran		25		•	•			•	
4-Dinitrato	90001	2.		•	•		•	٠	
Diethylphtheider	i derie	2;		•	•		•	•	
Chlorophina	316	2:		•	•		•	. (
Chicoropheny	4 childrophenyl phenylether	2	•	•	•		•)	
ruorene		0	•	•	•		1 4	0	
4-Nitroaniline	•	20		•			•	0	
4,6-Dinitro-2-methylphenol	-methy [phenol	05	•	1	•			•	
N-Nitrosodiphenylamine	anvi amine	2	•	•	•			•	
4-Bromondenvi - phenvi ethor	phony other	25	•		•		•	•	
Hexach Jorobonson	שוכוול ובנוופו	2;	•	•	•			•	
Dentach Cooperater	i ci i ci	0.		•	•			•	
Phone the company	1011	20		•	•			•	•
nenanthrene		01		•	•		•	•	
Anthracene		0.	•	•	•		•	•	
ol-n-butytphthatate	atate	0	•	•	•		•	• (
ridoranthene		0.	•	•	•				
ryrene		0	•	٠	•		. 4	•	
eury (penzytputhalate	nalate	10	•	q	•		,	•	
3,3'-Ulchlorobenzidine	enzidine	50	•	•	•			•	
Benzo(a)Anthracene	cene	10	•	•			•	•	
Chrysene		0	•	•				•	
bis(2-Ethylhexyl)phthalate	y()phthalate	9	•	27			•	•	
Di-n-octylphthalate	alate	0	•	2	•			Ę.	
nzo(b) Fluora	nthene	01	•	•	đ				
Benzo(k) fluoranthene	nthene	2	•	•	•	•	•		
nzo(a)Pyrene		10	•	•	0		•	•	
Indeno(1,2,3-c.d)Pyrene	.d)Pyrene	ţ		•	•		•	•	
benz(a.h)Anti	hracene	2	•		•		•	•	
Benzo(a.h. i)nervlene	rylene	2	•	•	•		•	•	
***************************************			•		•			•	
	Diluti	on factor: 1.0 1.0 1.0 1.0	1.0	1.0	1.0	61 61 61 62 64 64 64 64 64 64 64 64 64 64 64 64 64	1.0	1.0	
	Associated Met	Blank:		17173	17173	-	717		
322	Associated Equipment Associated Field	Black:	000 XX1XXXXIXXX	000SXX1XXX01XX 0	000SXX1XXX01XX	000SXX1XXX01XX		00gSXX1XXX01XX	
				•	•			•	

Box Number: 6091-224 #: Level D validation X: Mass spectrum does not meet EPA CLP criteria for compound presence is strongly suspected.

Summary Table

	SAMPLE LOCATION: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	02MU033XXX01XD 42739 # 01/29/91 01/31/91 02/13/91	02MU033XXX01XX 42738 # 01/29/91 01/31/91 02/13/91	02MU034XXX01XX 42735 # 01/29/91 01/31/91 02/12/91	02HU035XXX01XX 42736 # 01/29/91 01/31/91 02/13/91	02MW036XXX01XX 42737 # 01/29/91 01/31/91 02/13/91
ANALYTE	CROL					
Phenot	2;	•	•	•	•	•
ois(2-Chloroethyl)ether	10	•	•	•	•	•
-Chlorophenol	10	•	•	•	•	•
.3-Dichlorobenzene	10			•	•	•
4-Dichlorobenzene	10		•	ε	g	•
Benzyl Alcohol	•		•		•	•
.2-Dichlorobenzene	10	•	•	•	•	•
- Hethylphenol	•	•	•	•	•	•
is (2-Chlorofsopropyl) ether		•	•		•	•
-Methylphenol	10	•			•	18 ×
1-Nitroso-di-n-propylamine			•		•	
Hexachloroethane	10	•	•		•	•
Ni trobenzene .	10	•				•
Isophorone	10	•	•		•	•
2-Nitrophenol			•	•	•	•
2,4-Dimethylphenol	9	•	•		•	•
tenzoic Acid					•	•
vis(2-Chloroethoxy)methane		•	•	•	•	•
,4-Dichtorophenol			•	•	•	•
,2,4-Trichlorobenzene		•	•	•	•	•
Naphthalene			•	•	•	•
4-Chloroaniline	10		•	•	•	•
Hexachlorobutadiene	10			•	•	•
4-Chloro-3-Methylphenol	01	•			•	•
*- Methylnaphthalene	10	•	•	•	•	•
lexachi orocycl opentadi ene	01	•	•	•	•	•
.,4,6-Trichlorophenol	10		•			•
4,5-Trichlorophenol	50		•			•
-Chloronaphthalene	10	•	•	•	•	
2-Nitroaniline	20		•		•	•
Dimethylphthalate	10			•	•	
Acenaphthylene	10		•	•	•	•
2 A.Dinitrotofoon	Ç	,				•

Box Number: 6091-224 #: Level D validation X: Mass spectrum does not meet EPA CLP criteria for compound presence is strongly suspected.

Summary Table

02MU036XXX01XX 42749 # 01/29/91
02MU035XXX01XX 42748 # 01/29/91
02MU034XXX01XX 42747 # 01/29/91
02MU033XXX01XX 42750 # 01/29/91
02MU033XXX01XD 02 42751 # 01/29/91
SAMPLE LOCATION: LAB NUMBER: DATE SAMPLED:

ANALYTE	ראשר					
		,	•	,	•	•
imony	09		•	•	•	•
enic	10	•	0	•	•	•
5	200	•	•	•	•	•
yllism	S		•	•	•	•
micm	·	•	•	•	•	•
cium	2000	22800	22700	23500	26600	84900
omiten	01	•	•	•		
alt	20	•	•	•	•	•
per	25	•	•	•	•	•
. E	100	•	•	107	•	2660
-	m	•		6.5		
nesium	2000	7250	7230	2050	8250	23500
ganese	15	98.6	98.6	106	120	64.1
cury	0.5	•	•	•	2 1	
kel	07	•	•	•	•	•
assium	2000	•	•		•	•
enium	5	•	•		•	•
Ver	01	•	•	•	•	•
5	2000	6100	0009	5100	•	•
5:1	10	•	•		•	•
adium	50	•	•	•	•	•
U	50	•	•	•	•	•
nide	10	•	•	•	•	

PB4279 PB Associated Method Blank: Associated Equipment Blank: Associated field Blank:

Box Number: 6091-225 #: Level D validation

Summary Table

02HW036XXX01XX	45743 #	01/29/91
02MM035XXX01XX	42742 #	01/29/91
0	42741#	
02MV033XXX01XX	45744 #	01/29/91
02MU033XXX01XD	42745 #	01/29/91
SAMPLE LOCATION:	LAB NUMBER:	DATE SAMPLED:

ANALYTE	CROL					
Aluminum	200	1150	1150		•	•
t imony		•	•	•	•	•
senic				•	•	•
rica		•		•	•	•
ryllicm		•	•		•	•
dhi ch		•	•	•	•	•
lci sa		25000	24800	24300	26500	83100
romium		58.7 J	38.9	٥	•	•
balt				8	•	•
pper		•	•			•
uo		1660	1390	233	•	3100
pe		25.6	19.2 J	æ	•	•
gnesium		8070	2970	7310	8220	22800
nganese		144	147	112	121	639
rcury		•	•	•	•	•
ckel		•		•	•	•
tassium		•			•	5
lenium				•		•
lver		•	•	•	•	•
di G		7280	7840	5390	•	•
atticm		•	•	•	•	•
nadium		•			•	•
nc		9910 J	2820 J	•	•	•
ap jus		•	•	•	•	•

PB4279 PB Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

Box Number: 6091-225 #: Level D validation

PHASE II REMEDIAL INVESTIGATION (PCPT SURVEY)

Summary Table

	SAMPLE LOCATION: O2CWOO205201XX LAB NUMBER: 52516 DATE SAMPLED: 06/12/91	02CV00205201XX 52516 06/12/91	02CW00602401XX 53281 06/14/91	02CV01004601XX 53371 06/17/91	02CW01103501XX 53370 06/17/91
	DATE ANALYZED:	06/20/91	06/20/91	06/20/91	06/20/91
ANALYTE SOU-02/88	8 DL	•			
Chloromethane	2	8		•	•
Bromomethane	10	•	•	•	•
Vinct Chioride	10	•	•	9	•
Chloroethane	. ~	•	•		•
Enter one Chionide	ı -	4	•		•
Acatora Acatora	- ^	•	g		•
Carbon Disulfide	. —	•	29	•	٥
1.1-Dichloroethere	-	•	•	•	•
1.1-Dichloroethane	_	0	•	m	1
1,2-Dichloroethene (total)	_	•	99 EJ	27	8
Chloroform	-	•	•	6	4
1,2-Dichloroethane	_	8	•	~	6
2-Butanone	~	•	•	•	•
1,1,1-Trichloroethane	-	•	•	g	8
Carbon Tetrachloride	_	•	•	ø	•
Vinyl Acetate	~	•	•	•	•
Bromodichloromethane	-	•	•		e
1,2-Dichloropropane	_	•	•		q
cis-1,3-Dichloropropene	-	• ;		•	•
Trichloroethene		12	d 0012	•	•
Dibromochloromethane	_,	•	•	•	• 1
1, 1, 2-Trichloroethane		•		ė i	0 (
Benzene	- •	•	•	•	1 (
trans-1,5-Dichloropropene			• •		1 1
Bromotorm	- (1		1 4
4-Methyl-Z-Pentanone	v	•		•	
Z-Hexanone	V •				
Tetrachloroethene	-,	•	^		
1, 1, 2, 2-Tetrachloroethane		•	•	•	•
Toluene	-,	•	•	•	•
Chlorobenzene		• •	5 1		
Etnytbenzene	- •				. (
Styrene				• •	• •
lotal Aylenes	_			***************************************	
Dilut	Dilution Factor:	1.00	1.00	1.00	1.00

Box Number: 6091-106
aa: 02qpCPTXXX01XX

Associated Method Blank:
Associated Equipment Blank:
Associated Field Blank:
Associated Trip Blank:

 \$2743
 \$2743
 \$2743

 02qecptxxx01xx
 02qecptxxx02xx
 00qecptxxx03xx

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Summary sable

SAMPLE LOCATION: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:
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Dilution Factor: 1.0 1.0 1.0 1.0

\$2849 Associated Method Blank:
Associated Equipment Blank:
Associated Field Blank:
Associated Trip Blank:

Box Number: 6091-110 #: Region II Full Validation 60: 020DCPIXXX01XX and 029SCPIXXX01XX

Summary Table

	ā	DATE SAMPLED: DATE ANALYZED:	06/28/91 06/28/91	06/19/91 06/28/91
	SON-02/88	7		
Chloromethane		2	a	•
Bromomethane		7	•	
Vinyl Chloride		7		•
Chloroethane		7	•	•
Hethylene Chloride		_	•	•
Acetone		~		•
Carbon Disulfide		-	-	280
1.1-Dichloroethene		_	140	•
1.1-Dichloroethane			9	•
1.2-Dichloroethene (total)	tal)	-	18000	22
Chloroform		-		•
1.2-Dichloroethane		_	45	•
2-Butanone		7	~	~
1,1,1-Trichloroethane		_		•
Carbon Tetrachloride		-	•	•
Vinyl Acetate		~	~	~
Bromodichloromethane		_		•
1,2-Dichloropropane		_	•	•
cis-1,3-Dichloropropene	•	_	•	•
Trichloroethene			7	•
Dibromoch lorome thane		_	• (•
1,1,2-Trichloroethane		,		•
Benzene		-	100	•
trans-1,3-Dichloropropene	ene	_		•
Bromoform		_		•
4-Methyl-2-Pentanone		~	29 EZ	•
2-Hexanone		~	96 EJ	•
Tetrachloroethene		_	•	•
1,1,2,2-Tetrachloroethane	ane	_		•
Toluene		_	1100 07	•
Chlorobenzene		-		•
Ethylbenzene		- .	260 EJ	•
Styrene				• •
Total Volence		_	280 EJ	2

\$2863 \$2863 029ECP1XXX05XX 029ECP1XXX05XX Associated Method Blank:
Associated Equipment Blank:
Associated Field Blank:
Associated Trip Blank:

Box Number: 6091-108 #: Region II Full Validation @a: 0200CPIXXX01XX and 02qSCPIXXX01XX

•

SAMPLE LOCATION: O2CW03502901XX LAB NUMBER: 54966 R DATE SAMPLED: 06/29/91 DATE ANALYZED: 07/16/91

4

SOM-02/88

AWALYTE

6 4 6	ec oac	e exc	œ	œ	17 ا	~	~	~	e	0 c	2	~	: 6 2	~	e ex	: ex	œ	~	e	æ	~	~	ac	œ	6 4	~	e	œ	7 M	æ	~	œ
21		~	-	~		_	_		_	_	2	-	_	7	-	_	_	-	_		_	_		2	7	-		_	-	_	_	_
± 3	Vinyl Chloride	Chloroethane	Hethylene Chloride	Acetone	Carbon Disulfide	1, 1-Dichloroethene		1,2-Dichloroethene (total)	Chloroform	1,2-Dichloroethane	2-Butanone	1,1,1-Trichloroethane	Carbon Tetrachloride	Vinyl Acetate	Bromodichloromethane	1,2-Dichloropropane	cis-1,3-Dichioropropene		Oibromoch!oromethane	1,1,2-Trichloroethane	Benzene	trans-1,3-Dichloropropene	Bromoform	4-Hethyl-2-Pentanone	2-Hexanone	Tetrachloroethene	1,1,2,2-Tetrachloroethane	Toluene	Chlorobenzene	Ethylbenzene	Styrene	Total Xylenes

Dilution Factor: 1.0

Associated Method Blank: 020ECPT00701XX
Associated Field Blank: 0001CPT00601XX
Associated Field Blank: 0001CPT00601XX

Box Number: 6091-109 a: 00abcPT00201XX and 00ascPT00201XX **:** -

PHASE II REMEDIAL INVESTIGATION (FALL 1991)

	LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	N: MW-02-001 D: 02MW00100006XX R: 62412 # 09/20/91 D: 09/26/91	HN-02-007 6XX 02MJ00700006XX 62473 # 09/21/91 10/02/91	KX 02MU-02-011 6XX 02MU01100006XX 62474 # 09/21/91 10/02/91	6XX 02MJ0160006XX 62411 # 09/20/91 09/26/91	S MW-02-017 06XX 02MW01700006XX 62408 # 09/20/91 1 09/26/91	7 MW-02-019 36XX 02MW01900006XX 62415 # 1 09/20/91 1 09/26/91	9 MH-02-020 06XX 02MM02000006XX # 62416 # 1 09/20/91 1 09/25/91	6XX 02MM02100006XX 62058 # 09/18/91 09/24/91
ANALYTE SOW-02/88	סו								
Chloromathana	2		•	•	•		•	•	•
Recognitions	۰,	•	•	•	•	•	•	•	1
Viovi Chloride	۰,	•	•	1	•	•	•	•	1
Chloroethane	۰,	•	•	•	•		•	•	•
Methylene Chloride	ı —	•	•	•	•	•	•	•	•
Acatona Acatona	۰.	•	•	•	•	•	•	•	•
Carbon Disulfide	. 	•	•	•	•	•	•	•	•
1,1-Dichloroethene	-	•	•	•	•	•	•	•	•
1,1-Dichloroethane	_	•	•	• •	•	•	•	•	• 1
1,2-Dichloroethene (total)		•	•	240	•	•	2000	0086	ıs.
Chloroform			• •				• •		
2-Ditanco	- ^	1	•	•	•	•	~	~	α. α.
1.1.1-Trichloroethane		•		•	•	•	•	•	•
Carbon Tetrachloride	-	•	•	•	•	•	•	•	•
Vinyl Acetate	~	•	•	•	•	•	•	•	α
Bromodichloromethane		•	•	•	•	•	•	•	•
1, 2-Dichloropropane	•	•	•	•	•	• 1	• 1	• 1	• 1
Trichlocothere		• •	• •		• •	2000	•		. ~
Dibromoch loromethane		•	•	•	•	•	•	1	
1,1,2-Trichloroethane	_	•	•	•	•	•	• !	•	•
Benzene		•	•	•	•	•	170	230	•
trans-1,3-Dichloropropene		•	6	•	•	•	•	•	• 1
Bromotorm 6-Wethyl-2-Pentanone	- ~		•			•	•	•	•
2-Hexanone	2	_	e	~		~	œ	~	~
Tetrachloroethene		•	•	•	•	52	•	•	•
1, 1, 2, 2-Tetrachloroethane		•	•	•	•	4	•		•
Toluene		•	•	•	•	• 1	s 1	240	• •
Chlorobenzene		•	•	•	•	•	072	. 777	1 (
Etnylbenzene		•	•			•	040	*	. ,
Styrene Total Xylenes		•	•	•	•	•	740	1600	•
Dilution Factor: 1.00 1.00	Dilution Factor:	1.00	1.00	100	1.00	50.0	50.0	250	1.00 50.0 50.0 1.00
Associated Method Blank: Associated Equipment Blank:	Blank: Blank:	\$3976 8376 8376 83776 83776 83776 83776 83776 83776 83776 83776 83776 83776 83776 83776 83776 83	Y1348 000\$00500006XX	Y1348 000S00500006XX	83976 83976 83976 83976 83976 83976 83976 83976	83976 83976 83976 83976	83978 83978 83978 83978	\$3955 \$3955 \$3955 \$3955	000500300006XX
Associated Field Blank: Associated Trip Blank:	Blank: Blank:	0000 00200006XX 0001 00800006XX	0001009000000XX	000100200000XX	009000200006XX	000100800006XX	00a10080006xx	00aT00800006xx	000100600006XX

Surmary Table

PDL 2		LOCATION: 1SIS 1D: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	MW-02-022 02MW0220006DX 62060 # 09/18/91 09/24/91	MM-02-022 X 02M402200006XX 62059 # 09/18/91 09/25/91	MW-02-023 KX 02MW02300006XX 62056 # 09/18/91 09/25/91	MW-02-026 XX 02MM02600006XX 62410 # 09/20/91 09/26/91	MN-02-027 XX 02MU02700006XX 62409 # 09/20/91 09/26/91	MA-02-030 XX 02M403000006XX 62414 # 09/20/91 09/26/91	MV-02-031 6XX 02MU03100006XX 62475 # 09/21/91 10/02/91	MW-02-037 6124 # 61124 # 09/10/91 09/17/91
ride		Ы								
ride	Chloromethane	7	•	•	•	•	•	•	•	• •
ride 66 61 64 64 65 66 67 68 68 68 68 68 68 68 68 68 68 68 68 68	Bromone thane	2	•	•	•	•	•	•	•	•
ride	Vincl Chloride	~	•	•	•	•	•	•	•	•
130 EJ 120 1	Chlocoethene	. ~	•	•	•	•	•	•	•	•
130 EJ 1			•	•	•	•	•	4	•	4
al) 110 9 120	Metnylene Lulofide	- ^	•			•	•	•	•	•
al) 10 9 120	Acetone	.	•		•	•	•	•	•	•
10 9 120 1	Carbon Disultide		•		•	•	•	•	•	•
10 9 120 10 10 10 10 10 10 10	1 1-Dichionethane	. —	•	•	•	•	•		, 60	•
	1.2-Dichloroethene (total)	-	10	6	120	•	•	140	3500	1
ne 1	Chloroform	_	•	•	•		• •	• •	•	•
ne 1	1,2-Dichloroethane	 (•	•	•			ax
ne 1	2-Butanone	~	*	*	•	•	•	•	•	•
ne 1	1, 1, 1-Trichloroethane	-,	•		•	•	•		•	•
ne 10 1400 J R R R R R R R R R	Carbon Tetrachloride			•	•	•	•	•	•	•
ne	Vinyl Acetate	4-	٤	•	1	•	•	•	•	•
ne 1	Bromodichloromethane		•	•		•	•	•	•	•
ne 1	1 2-Dichloropropane		•	•		•	•	• ;	•	•
ne 1	cis-1,3-Dichloropropene		٥	1	1400	•	7	26	•	•
thane	Dibromochloromethane	-	•	•	•	•	•	•	•	• •
thane	1 1 2-Trichloroethane	_	•	•	' i	•	•	• \$	• •	•
thane	Benzene	-	•	•	5		•	7	•	•
thane	trans-1,3-Dichloropropene	-	•	•	•	•	• •	•	•	•
thane	Вготобогт	-	•	•	•		•	•	•	•
hene thicknown that the process of t	4-Hethyl-2-Pentanone	~		,						~
Associated Method Blank: 000500300006xx 0005000006xx 000100600006xx 000100600006xx 000100600006xx 00010060006xx 00010060006xx 00010060006xx 00010060006xx 00010060006xx 00010060006xx 000100600006xx 000100600006xx 000100600006xx 000100600006xx 000100600006xx 000100600006xx 00010060000000000	2-Hexanone	V -		•	•	•	•	•	•	•
Associated Method Blank: 000500300006xx 000500300006xx 00050000000000000000000000000000	letrachioroethene		•		•	•	•	•	•	•
Associated Method Blank: 000500300006xx 000500300006xx 00050000000000000000000000000000	Toluene	-	•	•	•	•	•	• •	•	•
Associated Method Blank: 000500300006xx 000500300006xx 00050000000000000000000000000000	Chlorobenzene	_	•	•	•	•	•		1 023	
Associated Field Blank: 000100600006xx 000100600006xx 000100600006xx 000100800006xx 0001008	Ethylbenzene	-	•	•	•	•	•	•		• •
Associated Field Blank: 000100600006XX 000100600006XX 000100600006XX 000100800006XX 0001008	Styrene	_	•	•	•	• •	0 4	•	1800	•
\$0.00 \$3955 \$306xx \$006xx \$006xx \$00000000000000000000	Total Xylenes	-	•				H W W W W W W W W W W W W W W W W W W W	11 11 11 11 11 11 11 11 11 11 11 11		11 14 11 11 11 11 11 11 11 11 11 11
Blank: 00gS00300006XX 00gS00300006XX<	manamentanessanda principal	n factor:	1.00	2.00	50.0	1.00	1.00	2.00	200	1.00
\$3975				1		,1010	72020	72029	87217	51701
BLBMR: 00020000000XX 000200000XX 00000000XX 000000200000XX 000000200000XX 000000200000XX 000000200000XX 000000200000XX 00000000	Associated Meth	Blanks		\$365S	55958 559500005005000	07958 0005005000	07968 000000000000000000000000000000000000	07458 000050005000	xx900005005000	
$Blank_2$ 009700600006xx 009700600006xx 009700600006xx 00970000xx 009700600006xx 009700000xx	Associated Equipme	Blank:		00000200006XX	00ab00200006xx	0000002000000xx	00ab00200006xx	000000200006XX	00a000200006xx	00000100006XX
	Associated Trip	Blank:		000100600006xx	000100600006XX	000100800000exx	0001008000000	004100800006XX	004100900000	VY000001001000

Summary rable

	LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	MV-02-038 02MJ03800006XX 61125 # 09/10/91	MW-02-039 XX 02MW03900006XX 61947 # 09/17/91 09/23/91	MW-02-040 6XX 02HW04000006XX 61593 # 09/12/91 09/18/91	0 MW-02-041 06XX 02MW041000060X 61949 # 09/17/91 09/24/91	1 MW-02-041 060X 02MW04100006XX 61948 # 1 09/17/91 1 09/23/91	1 MM-02-042 36XX 02MM0420006XX 61592 # 09/12/91 09/18/91	2 MN-02-043 06XX 02MU04300006XX # 61950 # 1 09/17/91		MW-02-044 02MH04400006xx 61126 # 09/10/91 09/17/91
ANALYTE SOW-02/88	7									
	2	•	•	•		•	•	•		,
Richmethane	10	•	•	•	•	•	•			
Vinyl Chloride	. 7	•	•	•	•	•	•	•		
Chioroethane	۰ ۲	•	•			•	•	•		•
Methylene Chloride	ı 	•	•	•	•	•	•	•		
Acetone	7	•	•	•		•	•	•		
Carbon Disulfide		•	•	•	•	•	•	•		•
1,1-Dichloroethene		•	•	•	•	•	•			•
1,1-Dichloroethane		. 57	• •	180	· 0099	. 0009	- 040			
Chloroform		;·	•	3 '	3	3	•	•		.
1,2-Dichloroethane	_		•	•	٠	•	•	•		•
2-Butanone	~	~		~	∝	~	~	œ	~	œ
1,1,1-Trichloroethane		•	•	0	e	•	•	•		•
Carbon Tetrachloride	- - (•	•	•	•	•	•	•		•
Vinyl Acetate	v •	•	•		0	•	•	•		
1 2.Dichloromethane				• •	• 0	8 ú	• •	• 1		• •
rie-1 3-Dichloropone		•	•		•	•	•	•		
Trichloroethene	- ,	29	3900	•	8	•	09	100		26
Dibromochloromethane	_	•	•	•	•	•	•	•		
1,1,2-Trichloroethane		•	•	•	•	•	•	•		•
senzene trans-1 1-Dichlocopropana		• •	•	•	• •		• •	• •		
Bromoform		1	•	•	•	•	•	•		
4-Methyl-2-Pentanone	~~	٠	•	•	•	•	٠	•		
2-Hexanone	~	œ	_	~		œ	æ	~	ec	œ
Tetrachloroethene	-•	•	•	•	•	•	•	•		
1,1,2,2-letrachioroethane		• •	• •	• •	• •	• (•	•		
Chlorobenzene		•	•	•	•	• •	•	• •		
Ethylbenzene			•	•	•	•	•	•		•
Styrene		•	•	•	•	•	•	•		•
Total Xylenes	-	•			•	•	•	•		
Dilution Factor: 5.00	Dilution Factor:	5.00		2.00	250	5.00 250 250 50.0 1.00	50.0	5.00		1.00
	1	51701	30023	07000	30023	10050	2000	90020		101
Associated Method Associated Equipment	Blank:		coves	00050020000000000000000000000000000000	coxes	cuyes -	000500200006xx	coves		55/65
Associated Field	Blank:	00ab00100006xx	00000000000000000000000000000000000000	00000100006XX	00ab00200006xx	00ab00200006XX	000000100006XX	000D00200006XX	000000100006XX	XX9
Associated irip	BI BUK:		AACOUUCUU I PUI	UUU I UUDUUUUUUAAA	UUUI UUDUUUUUUU	UNGLOUDOUNGOVA	UUGIOOOOOOO	UUGI UUSUUUUSAA		OXX

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Total Miles Mile					270 00 101	770-07-IM	870-00-MM	870-CU-FM		MU-04-010	
ride		LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:							xx 02MU04900006xx 61127 # 09/10/91 09/17/91	70	
ride de hene (total) lane lane lane cethane lane lane lane lane lane lane lane l	٠	2									
Concented Conc					•	•	•	•	•	•	
ride de hane hane hane hane hane hane hane cethane loride cothane loropropene ethane ethane loropropene loropropene loropropene loropropene tanone Cothane loropropene	loromethane	2	•	•	•		1	•	•	•	
ride hene hene hene hene hene hene hene hane lorida cethane cothane cothane loropropene tanone loropropene tanone Dilution Factor: Dilution Factor: Dilution Ralank: Occorated Evipment Blank: Occorated Field Blank:	conceethane	7		0	0	•	•	•	1	,	
ride		. ~	•	•	•	•	•	•	•	•	
Continue	myt cirtor rue	10	•	•	•	•		•	•	•	
1 250 200	Coroetnane	-	•		•	_	•	•	•	•	
high continuents of the field Blank: a speciated Field Blank: a speciat	thylene unioride	- ^	•		c	•	•	•	•	•	
The notion of the second of th	etone	y -	•	•	•	•	•	•	•	•	
1-Dichlorocethene (total) 1 250 200 200 lorocethene (total) 1 250 200 200 lorocethene (total) 1 250 200 200 lorocethene (total) 1 250 200 200 200 lorocethene 2 2-Dichlorocethene 2 2-Dichloropropane 2-Dichloropr	rbon Disulfide		•	•	•	٠	•	•	•	•	
1-Dichloroethane 2-Dichloroethane 2-Dichloroethane 3-Dichloroethane 2-Dichloroethane 3-Dichloroethane 3-Dichloropropane	1-Dichloroethene			•	•	•	•	•	•	•	
2-Dichloroethene (total) loroform loroform 1,1-Trichloroethane 2-Dichloroethane 2-Dichloropropane 3-1,3-Dichloropropane 1,2-Trichloroethane 1,2	1-Dichloroethane		ישני	000	9	•	23	%	•	•	
Lorobenzene 1.1. Trichloroethane 2.2 Butanone 2.2 bichloroethane 2.2 bichloroethane 2.2 bichloroethane 2.2 bichloropropane 3-1,3-Dichloropropane 3-1,3-Dichloroethane 1,2-Trichloroethane	2-Dichloroethene (total)		007	903	•	•	•	•	•	•	
2-Dichloroethane 1,1-Trichloroethane 1,1-Trichloroethane 1,2-Dichloropropene 2-Dichloropropene 2-Dichloropropene 1,2-Dichloropropene 1,2-Trichloroethane 1,2-Trichloro	loroform		•	•		•	•	•	•	•	
Butanone 1,1-Trichloroethane 1,1-Trichloroethane 1,2-Dichloropropene 2-Dichloroethane 2-Dichloroethane 1,2-Trichloroethane 1,2-Trichloroethane 1,2-Trichloroethane 1,2-Tetrachloroethane 1,2-Tetrachlo	2-Dichloroethane	-	•	•	•	•				œ	
1,1-Trichloroethane	Butanone	7	œ				•	•	•	•	
hane	1.1-Trichloroethane	-	•	•		•			•		
my Acetate comodichloromethane 2-Dichloropenee 1-2-Dichloropropene 1-2-Dichloropropene 1-2-Trichloroethane 1-2-Trichloroethane 1-2-Trichloroethane 1-2-Tetrachloroethane 1-2-Tet	schon Tetrachloride	_	•	•	•	•	•		1	1	
omodichloromethane 2-Dichloropropane 3-13-Dichloropropane 1-2-Inchloroethane 1-2-Irichloroethane 1-2-Irichloroethane 1-2-Irichloroethane 1-2-2-Tetrachloroethane 1-2-2-Tetrachloroethane 1-2-2-Tetrachloroethane 1-2-2-Tetrachloroethane 1-2-3-Tetrachloroethane 1-2-3-Tetrachloroethane 1-2-3-Tetrachloroethane 1-2-3-Tetrachloroethane 1-3-3-1-3-1-3-3-3-3-3-3-3-3-3-3-3-3-3-3	incl Acetate	~	•	•	•			•	•		
omogrant or marginals of the following series of the following series of the following series of the following series of the following series of the field Blank: 000200006xx 000200006xx 000200006xx 000200006xx 000200006xx 000200006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 0002000006xx 00020000006xx 00020000006xx 00020000006xx 000200000006xx 00020000006xx 00020000006xx 00020000000000	TINE ACCIDIO		•	•	•	•	•	•	•	•	
1,2-Trichloropropene 1 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	Comodich to come than e		•	•	•	•	•	•	•	•	
selloroethere in the field Blank: 000200006xx 000200006xx	Z-Dichier opropane		•	•	•	•	•	1	•	•	
thane	18-1, 3-Dichloropropene		•		•	•	280	400	•	•	
thane	ichloroethene	- •	•	•	•	•	•	•	•	•	
thane	bromochloromethane		•		•	•	•	•	•	•	
thane	1,2-Trichloroethane		•	•	•	•	•	•	•	•	
thane	nzene	_	•	•	•	•	•	1	•	•	
thane	ans-1,3-Dichloropropene	-	•	•			•	•	•	•	
thane	omoform	_	•	•			•	•	•	•	
thane	-Methyl-2-Pentanone	~	•	•	•	•				04	
### schloroethane	Hexanone	2	E			•			•	•	
1	strach oroethene	_	•	•	•	•	•	•	,	•	
s Sacciated Method Blank: 000000100006xx 000000100006xx Associated Field Blank: 000000100006xx 000000100006xx Associated Field Blank: 000000100006xx 000000100006xx Associated Trip Blank: 0000100006xx 0000001000006xx	1.2.2-Tetrachloroethane	_	•	•	•	•	•	•	• •	•	
1	liens	-	•	•	•	•	•	•	•		
s Associated Method Blank: 000200100006XX 000200100006XX Associated Field Blank: 000200100006XX 000000100006XX Associated Field Blank: 000000100006XX 000000100006XX Associated Trip Blank: 000010020006XX 000000100006XX	1 orobenzene	_	•	•	•	0	•	•	•	•	
1 1 1 1 1 1 1 1 1 1	hylbenzene	_	•	•	•	•	•	•	•		
1.00				•	•	•	•	•	•	•	
Associated Method Blank: 00020010006xx 000200100006xx 0002000006xx 000200006xx 000200006xx 0000000006xx 0000000000	lyrene stal Xvlenes		•		•	•	•	•	•		
1.00 1.00 20.0 20.0 20.0 20.0 20.0 20.0			;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;								
S1976 S1978 S1808 S1808 S1808 S1920 S1976 S197	Dilutio	on Factor:	10.0	10.0	1.00	1.00	10.0	20.0	1.00	00.1	
Blank: 000200100006XX 000200100006XX 000200100006XX 000200300006XX 000200500006XX 000200006XX Blank: 00000100006XX 000000100006XX 000000100006XX 000000100006XX 000000100006XX 000000100006XX 000000100006XX 000000100006XX 000000100006XX 000000006XX 000000006XX 00000000	3		10713	STRUB	S3808	83920	83976	83976	\$3793	\$3905	
Blank: 000D00100006XX 000D00100006XX 000D00100006XX 000D0006XX 000D006XX 000D006XX 000D006XX 000D0006XX 000D0006XX 000D0006XX	Associated Heti Associated Equipme	B ank:	QS00100006XX	000S0010006XX	000S00100006XX	00020030000000000000000000000000000000	00050050000000000000000000000000000000	XX900000000000000000000000000000000000	-	- xx900002000000	
	Associated Fit	Blank:	QD00100006XX	0000001000006XX 000100200006XX	000100200006XX	00010060006xx	000100800006xx	000T00800000XX	000100100006XX	00q100500006xx	
	Associated in										

Summary laure

MANALYTE SOW-02/88		LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE ANALYZED:	MV-04-004 04MV00400006XX 61952 # 09/17/91 09/24/91	MW-04-005 (04MW0500006XX 61590 # 09/12/91 09/18/91	MW-04-006 (X 04MW00600006XX 61953 # 09/17/91 09/24/91	6 MW-13-002 06xx 13MU00200006xx # 62057 # 1 09/18/91	0002 00006xx 77 # 791	HW-16-001 16HU00100006XX 61589 # 09/12/91 09/18/91	XX
	ш	9							
		2	•	•	•		1	•	
	omethene	10	•	•	•			•	
		40		•	•				
	- Cutoride	u (1	1			1	•	
	roethane	7	•	•	•			•	
	ytene Chloride	-		•	•		-	•	
	one	7	•	•	•			•	
	on Disulfide			•	•		c	•	
	icht oroethene	-	•	•	•			•	
	ichi oroethene		•	•	•			•	
	Sich Concettons (total)		•	•	•				
	Jenior definerie (10181)	- •		i ,					
		- •	•	•	•			•	
	Ichloroethane	- (•		•		,	•	
	tanone	7	~	*		æ	œ	2	_
	I-Trichloroethane		•	•	•			•	
	on Tetrachloride	-	•	•	•			Q	
	Acetate	~	•	•	•		œ	8	
	dichloromethane	_	•	•	•			•	
	ichloropropane	-	•	•	•		•	9	
	.3-Dichloropropene	-	•	•	•			•	
	loroethene	-		62	•			6	
	mochloromethane	-		•	•		•	•	
	:-Trichloroethane	-	•	•	•			•	
	20	-	•		•		•	•	
	-1.3-Dichloropropene	_	•	•	•		6	•	
	form	-	•	٠	•			0	
	hyl - 2-Bentenone	- 0	٠	•	•			•	
	nyt-c-rentatione	40		•	•		4		
		.	2	•			ť		
	chloroethene		•		•			•	
	, z - i etrachioroethane	-,	•	•	•			•	
	Je	 (•	•	•		.8		
	openzene	_	•	•	•			•	
	benzene	_	•	•	•			•	
		_	•	•	•	•		•	
	XVIenes		•	•	•			•	
		11 11 11 11 11 11 11 11 11							
ethod Blank: \$3905 \$3808 \$3905 \$33909 \$3920 \$392		on Factor:	1.00	5.00	1.00	0.1	0	5.00	!
pment Blank: 00g00200006xx 00g000006xx 00g000200006xx 00g00200006xx 00g002200006xx 00g100500006xx 00g10050000006xx 00g1005000006xx 00g1005000006xx 00g1005000006xx 00g10050000006xx 00g1005000006xx 00g1005000006xx 00g1005000006xx 00g100500000000000000000000000000000000	Associated Meth			83808	83905	839		83808	
II IP BEGIN: UURIOUJUUUNA OURIOUJUUNAA UURIOUJUUUNAA UURIOUJUUNAA		Blank: Blank:			00000200006XX	000200300006) 000000200006)		000S00Z00006XX 000D00100006XX	
		B L BITK:			מאסטטטטטטטטטטטטטטטטטטטטטטטט	00410000000		VYONDONEDO	

	LOCATION: 1SIS 1D: 1SIS 1D: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	MU-02-001 02MU00100006XX 62423 # 09/20/91 10/25/91	MM-02-007 02MM00700006XX 62482 # 09/21/91 09/28/91	MA-02-011 02MW01100006XX 62483 # 09/21/91 09/28/91	MM-02-016 02MU0160006XX 62422 # 09/20/91 09/25/91	MV-02-017 02MN01700006XX 62419 # 09/20/91 10/24/91	MW-02-019 02MW01900006XX 62426 # 09/20/91 09/25/91	MW-02-020 02MW02000006XX 624.27 # 09/20/91 09/25/91	M4-02-021 02M402100006XX 62070 # 09/18/91 10/25/91
s	CROL								
				•	•	•	•	5	•
Phenol	2:	•	. !	1	•	•	•	•	•
bis(2-Chloroethyl)ether	2	•	•	ı		•	1	•	•
2-Chlorophenol	9	•	•	•)	1	•	•	•
1.3-Dichlorobenzene	2	•	•	•	•	•	•	•	•
1.4-Dichlorobenzene	9	•	•	,		. 1		•	•
Benzyl Alcohol	£	•	•	•	•	1 1	1	•	•
1 2-Dichlorobenzene	9	•	•	•	•	•			•
2-Methyl chood	Ç	•	•	•	•	•	•	•	
Ling the motor of the ber	2 \$	•	•	•	•	•	•	* *	•
DIS(2-chlorolsopropyl)etilel	2 5	•	•	•	•	•	•	3	•
4-Hethylphenol	2 \$	•	•	•	•	•	•	•	
N-Nitroso-di-n-broby tamine	2 \$	•	E	•	•	•	•	•	•
Hexachloroethane	2 \$	•	•	•	•	•		•	•
Kitrobenzene	29		•	ŧ	•	•	•	•	•
Sophorone	2;	ı	: (•	•	•	•	•	
2-Nitrophenol	29	•		•	•		12	51	•
2,4-Dimethylphenol	2;	•		•	•	•	•	•	•
Benzolc Acid	2	•		•	•	•		•	•
bis(2-Chloroethoxy)methane	23	•		•	•	•	•	•	•
2,4-Dichtorophenol	2	•	•	. •	•	•	•	•	71
1,2,4-Trichlorobenzene	29	•	•	•	•	•	75	53	•
Naphthalene	29	•		•	•	•		•	•
4-Chloroaniline	2;	•		•	•	•	•	•	•
Hexachlorobutadiene	29	•		t	•	•		•	•
4-Chloro-3-Methylphenol	2;	•		•	•	•	23	57	•
2-Methylnaphthalene	2;	•		•	•	•	•	•	•
Hexachlorocyclopentadiene	29	•		•	•	•		•	•
2,4,6-Trichlorophenol	2;		, ,	•	•	•	•	•	•
2,4,5-Trichlorophenol	2	•	•		•	•	•	•	•
2-Chloronaphthalene	21	•	•	•	•	•	•	•	•
2-Nitroaniline	2:	•		•	•	•	•	•	•
Dimethylphthalate	2	•	•	•	ı	. (•	•	•
Acenaphthylene	2	•	•	•	•	•		•	•
2 6-Dinitrotoluene	9	•	•	•	•	•			

Site: Fire Training Area #: Level D Validation

Summary Table

·	LOCATION: 1S1S 1D: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	ID: 02MA010006XX ID: 02MA0100006XX IE: 62423 # IED: 09/20/91 IED: 09/25/91 IED: 10/25/91	HW-02-007 6XX 02MH00700006XX 62482 # 09/21/91 09/28/91 11/01/91	MW-02-011 6XX 02MU1100006XX 62483 # 09/21/91 09/28/91	1 MW-02-016 06XX 02MU01600006XX 62422 # 1 09/20/91 1 09/25/91	S MH-02-017 36XX 02M401700006XX 62419 # 109/20/91 10/24/91	7 MM-02-019 36XX 02MM01900006XX 62426 # 09/20/91 1 09/25/91	19 MW-02-020 106XX 02MW02000006XX 62427 # 11 09/20/91 11 09/25/91	D MM-02-021 D6XX 02MM02100006XX 62070 # 09/18/91 1 09/23/91
ANALYTE SOW-02/88	CROL								
2. Eiterori (50	6	•	•	•	•	•	•	•	,
	2		• 1	•		1	•	•	•
Acenaphthene	2:	•		•	•	•	•	•	•
2,4-Dinitrophenol	2	•	•	•	•	•	•	•	•
4-Nitrophenol	2	•	•	•	•	•	•	•	
Dibenzofuran	2	•	•	•	•		•	•	•
2.4-Dinitrotoluene	10	•	•	•	•	•	•	•	•
Diethylphthalate	10	•	•	•	•	•	•	•	1
6.Chlorophanyl-phanylather	2	•	•	•	•	•	•	•	•
The contract of the contract o	2 5	1	1	(•	(1	1	
r Luorene	2 6		•	,	•			•	•
4-Nitroaniline	2 6	•	•	•	•	•	•	•	•
4,6-Dinitro-Z-methylphenol	2	•	•	•	•	•	•	•	•
N-Nitrosodiphenylamine	2	•	•	•	•	•	•	•	•
4-Bromophenyl-phenylether	2	•	•	•	•	•	•	•	•
Hexachlorobenzene	2	•	•	•	•	0		•	•
Pentachlorophenol	20	•	•	•	•	•	•	•	•
Phenanthrene	2	•	•	•	•	a	•	•	•
Anthracene	2	•	•	•	•		•	•	•
Di-n-butylohthalate	9	•	•	•	đ	•	•	•	•
Fluoranthene	2	•	•	•	•	e	•	•	•
Pyrene	9	•	•	•	•	•	•	•	•
Rutylbenzylphthalate	9	•	٠	•	•	•	•	•	•
3 3/-Dichlorobenzidine	2		•	•	•	•	•	•	•
Renzo(a) Anthracene	2		•	•	•	•		•	•
Chrysene	9	•	•	•	•	•	•	•	•
his (2-Ethylhexyl Johthal ate	2	•	•	17		•	•	1	•
Di-o-orty obthe ete	:	•	•	: •	•	•	•	•	•
Rento(h)Fluoranthene	2	•	•	•	•	•	•	•	•
Renzo(k) Fluoranthene	10	•	•	•	•	•	•	•	•
lenzo(a)Pyrene	2	•	•	•	•	•	•	•	•
Indeport 2.3-c d)Pyrene	2	•	•	•	•	•	•	•	•
libera (a h)Anthracene	:	•	•	•	•	•	•	•	•
Jones A Doesylone	2 5	•	٠	•	•	•	•	•	•
benzolg,n, 1)perytene	01	III	10 10 10 10 10 10 10 10						
Dilutio		}	1.00	1.00	1.00	1.00	1.00	1.00	1.00
- Veral Dathod Mathod	od Blank.	01175	91265	01245	7,110	K119	01176	7,110	7510
Associated Foundment	Blank:	XX900005000000			XX90000500000	XX900005005000	XX90005005000	000500500	#6214
Associated Field	8 lank:	000D00200000XX	00q000200006xx	00qD00200006XX	009D002000GXX	009D00200006XX	00q000200006XX	-	00q000200006xx

Summary rable

SOW-02/88 CR L)ether ene ene ropyl)ether								
hyl)ether nzene nzene opropyl)ether								
hyl)ether nzene nzene nzene opropyl)ether							• •	•
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nzene nzene nzene opropyl)ether							8	•
nzene nzene nzene opropyl)ether								
nzene nzene opropyl)ether -propylamine							•	
nzene opropyl)ether -propylamine							•	
nzene opropyl)ether propylamine							•	•
opropylemine				• • •			•	
opropyl)ether propylamine						, ,	•	•
propytamine				1	•	•	•	•
-propylamine	•	•	•	,			•	33
	, ,	1		•	•	ŧ	•	; '
			•		•	•	•	•
hane		•		1 (. (. (•
Nitrobenzene 10			•	•	ı	,	1	ı
Isopharone 10		•	•	0	•	•	•	•
2-Nitrophenol 10		•	•	•	•	•	•	• !
thenot		•	•	•	•	•	•	17
Benzoic Acid 50	•	•	•	•	•	•	•	•
ethoxy)methane		•	•	•	•	•	•	•
-	•		•		•	•	•	•
1,2,4-Trichlorobenzene 10		•	•		•	•	•	• 1
Naphthalene 10		•	•	•	•	•	•	39
line		•	•	•	•	•	•	•
fene		•	•		•	•	1	
uol		•	•	•	•	•	•	• ;
2-Methylnaphthalene 10		•	•	•	•	•	•	91
Hexachiorocyclopentadiene 10		•		•	•	•	•	•
2.4.6-Trichlorophenol		•	•	•	•	•	•	
2.4.5-Trichlorophenol 50			•	•	•	•	•	•
2-Chloronaphthalene			•	•	•	•	•	
2-Nitroaniline 50		•	•	•	•	•	•	•
Dimethylchthalate 10		•	•	•		•	•	•
		•	•		•	•	•	•
Jene	•	•	•	•		•	•	•

Site: Fire Training Area #: Level D Validation

Summary Table

	LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	MV-02-021 02MU02100006XX 62070 R # 09/18/91 09/23/91 10/28/91	MN-02-022 X 02MN022000060X 62072 # 09/18/91 10/25/91	MW-02-022 XX 02MW02200006XX 62071 # 09/18/91 10/25/91	MW-02-023 SXX 02MM0230006XX 62068 # 09/18/91 09/23/91 10/24/91	6XX 02M40260006XX 62421 # 09/20/91 10/25/91	6XX 02MU02700006XX 62420 # 09/20/91 09/25/91	KX 02MW300006XX 62425 # 09/20/91 09/25/91 10/28/91	MM-02-031 62484 # 09/21/91 10/31/91
ANALYTE SOM-02/88	CROL								
	50	•	•	•	•	•	•	•	•
A	25	•	•	•	•	•	•	•	•
Acenaphtnene	2 5		•	•	•		•	•	•
Z,4-Dinitrophenot			ı	•	•	•	•	•	•
4-Hitrophenol	25	•	ı				• •		•
Dibenzofuran	29		•	•	•	•		•	
2,4-Dinitrotoluene	2;	•	•	•	•	•	•	•	•
Diethylphthalate	2;	•	•	•	•	•			
4-Chlorophenyl-phenylether	2	•	•	•	•	•	•	•	•
Fluorene	9	•	•	•	•	•	•	•	4
4-Nitroaniline	20	•	•	•	•	•	•	•	•
4.6-Dinitro-2-methylphenol	20	•	•	•	•	•	•	•	•
N-Nitrosodiphenylamine	2		•	•	•	0	•	•	•
4-Bromonhenyl -phenylether	9	•	•	•	•	•	0	•	•
Hexachlorobenzene	9			•	•	•		•	•
Bentech orotherol	2.5	•		•	•	0	•	•	•
phononthonon	2	•	•		•	•		•	•
	2 5		•	•	•	•	•	•	•
Anthracene Principle the between	2 5	•	•	•	•	•	•	•	•
51-n-parkiphrusiste	2 5	•	•	•	•	•	•	•	•
ruorantnene	2 5		•	•	•	•	•	•	•
Pyrene	2 \$	•	•	•	•	•	•	•	•
Butyl Denzyl pritrial ate	2 5	•	•	•	•	•	•	•	•
5,5'-Dichloropenziaine	2 5		•		•	•	•	•	•
Benzo(a)Anthracene	25	1		•	•	•	•	•	•
Chrysene	2;	•	1				72	•	•
bis(2-Ethylhexyl)phthalate	2:	•	•	•	•	1	9	. 1	1 4
Di-n-octylphthalate	2:	•	•	•	•	•	•	•	
Benzo(b) Fluoranthene	2	•	•	•	•	•	•	•	•
Benzo(k) Fluoranthene	2		•	•	•	•	•	•	•
Benzo(a)Pyrene	2	•	•	•	•	•	•	•	•
Indeno(1,2,3-c,d)Pyrene	2		•	•	•	•	•	•	•
Dibenz(a,h)Anthracene	9	•	•	•	•	•	•	•	•
Benzo(g,h,i)perylene	9		•	•	•	•	•	•	•
								11 11 11 11 11 11 11 11 11 11 11 11 11	
Dilution	Dilution factor:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Was a bodden bode incom	of order	P1254	P1254	P1254	P1254	P1175	P1175	P1175	P1265
Associated Fquipment	Blank			xx900002005000	000S00300000	000S00S00S00	000S00S000	000\$00500006XX	***************************************
Associated Fie	Blank:	00aD00200006xx 0	00aD002000000xx (00aD00200006xx	000D00Z000000XX	000D00Z00000XX	000D00200000XX	00000020000000XX	OUGDOOSOOOOXX

PROJECT: Plattsburgh A.F.B. - Fall of 1991

۵	ISIS ID: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	M4-02-05/ 02MU03700006XX 61128 # 09/10/91 10/04/91	MX-02-038 02MM03800006XX 61129 # 09/10/91 10/01/91	02HU04000006XX 61598 # 09/12/91 09/16/91 10/21/91	02MU04100060X 61956 # 09/23/91 10/21/91	02MU04100006XX 09/17/91 09/23/91 10/21/91	024404200006XX 61597 # 09/12/91 09/16/91	02Mu04300006xx 61957 # 09/17/91 09/23/91	02MU0440006xx 61130 # 09/10/91 09/15/91 10/04/91
SO	CROL								
	10	•		•	•	110	•		•
FileHol	2 5	•	•	•	•	•		•	•
Dis(2-Interdenty) etner	2 \$	•	•	•	•	130	•	•	•
1 3-Dichlerotense	25	•	•	•	•	•	•		•
1 2-Dichlorobenzene	2 =	•	•	•	•	•	•	•	•
Bear Alcohol	2 =	•	•	•	•	•	•	•	
1 2-Dichlorobenzene	2 =	•	•	•		•	•	•	
2-Methylpheod	2 5		•	•	•	•	•	•	•
bio/2-chlorojeopropyllather	2 5	•		•	•	•	•	•	•
7-Mathylpheool	2	•	•	•	•	•	•	•	•
u-uttocondi-procondine	2 =	•	•	•	•	•	•	•	
Harried Control of the Control of th	2	•	•	•	•	•	•	•	•
nevaciated became	25	•		•	•	•	•	•	•
I conforme	2 5	•	•	•	•	•	•		•
2- uttochenol	2 €	•	•	•	•	•	•	•	•
2 4-Dimethylphenol	2 5	•	•	•		•	•	•	•
Beatoin Arid	20.5	•	•	•	•	•	•	•	•
his/2-chlocoethoxy)methane	2		•	•		•	•	•	•
2.4-Dichlorophenol	2	•	•	ø	•	•	•	•	•
1.2.4-Trichlorobenzene	2	•	•	0	•	•	•	•	•
Naphthalene	2	•	•	•	•	•	•	•	
4-Chloroaniline	5		•	•	•	•	•	•	
Hexach Lorobutadiene	2	•		q	•	• (•	•	•
4-Chloro-3-Methylphenol	유	•	•	•	0	f 25		•	•
2-Hethylnaphthalene	2	•	•	•	•	•	•	•	•
Hexachlorocyclopentadiene	2	•				•	•	•	•
2.4.6-Trichlorophenol	2		•	•	•	•		•	•
2.4.5-Trichlorophenol	20	•	•	•	•	•	•	•	•
2-Chtoronachthalene	2		•	•	•	•	•	•	•
2-Witroaniline	20		•	•	•	•	•	•	•
Dimethylohthalate	2	•	•	•	•	•	•	•	•
Acenary the Page	10		•		•	•	•		•
2 A-Dinitrotoliene	2	•	•		•		•	10 10 10 10 10 10 10 10 10 10 10 10 10 1	

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	LOCATION: 1SIS ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	MV-02-037 02MJ03700006XX 61128 # 09/10/91 09/15/91	MW-02-038 02MW03800006XX 61129 # 09/10/91 10/01/91	X 02MW-02-040 X 02MW04000006XX 61598 # 09/12/91 09/16/91	MW-02-041 X 02MM041000060X 61956 # 09/17/91 09/23/91	MV-02-041 X 02MU04100006XX 61955 # 09/17/91 09/23/91 10/21/91	MW-02-042 X 02MW04200006XX 61597 # 09/12/91 10/24/91	(X 02MH0430006XX 61957 # 09/17/91 09/23/91	MM-02-044 K 02MU0400006XX 61130 # 09/10/91 10/04/91
	CRUL								
	2	•	•	•	•	•	•	•	•
5-RITCORNILINE	25	. 6	•	•	•	•	•	•	•
Acenaphthene	2 5		•	•	•	•	•	•	•
2,4-Dinitrophenol	25	•		•	•	1. 071	•	•	•
4-Nitrophenol	25	•	•	•		2 .	•	•	•
Dibenzofuran	2\$	•		•	•	•	•	•	
2,4-Dinitrotoluene	2\$		•		•	•	•	•	
Uletnyiphtnalate	2 5	•	•	•	•	•		•	•
4 - Chilorophienyi - phenyi etner	2 5	•	•	•	•	•	•	•	•
	25	•	•	•	•	•	•		•
4-Rittounitine	3.5	•	•	•	•	•	•	•	•
u. Nitrocodisherylesine	2	•	•	•	•	•	•	•	•
A - Bromoshonyl - shenyl other	2.5	•	•	•	•	•	•	•	•
4-bi dioparent - prente de circi	2	•	•	•	•	•	•	•	
Destach prophenol	205	•		•	•	140 J	•	•	•
Dhananthrana	9	•	•	•	•	•	•	•	•
Anthracena	2	•	•	•	•	•	•	•	•
ni-n-butvirhthalate	2		•	•	•	•	•		•
Fluoranthene	2		•	•	•	•	•	•	
	9	•	•	•	•	•	•		
Rutylbenzylphthalate	9	•	•	•	•	a	•	•	•
3.3'-Dichlorobenzidine	2	•	•	•	٠	•	•	•	
Benzo(a)Anthracene	2	•		•	•		•	•	•
Chrysene	9	•	•	•	•	•	•	•	•
bis(2-Ethylhexyl)phthalate	2	•	•	•		•	•	•	·
Di-n-octylphthalate	2	•	•	•	•		•	•	•
Benzo(b) Fluoranthene	2	•	•	•	•	8	•	•	•
Benzo(k)fluoranthene	2	•	•	•	•	•	•	•	•
Benzo(a)Pyrene	₽	•	•	•	•	6	•	•	•
Indeno(1,2,3-c,d)Pyrene	2	•	•	•	•	•	•		•
Dibenz(a.h)Anthracene	2	•	•	•	•		•	•	1
Benzo(g,h,i)perylene	0	•	•	•		•	•	•	
1.00 1.00 1.00 1.00					1 00	1.00	1.00	1.00	1,00
מומנונ	DILUTION FACTOF:	0	20.	3	3		2		
Louis Letainos de Louis de La Constantino de La	od Blank:	V5085	V5085	P1118	P1254	P1254	P1118	P1254	W5085
Associated Equipment								•	
Associated Field	Blank:	QD00100000XX	QD00100006XX 0	00q000100000xx	00aD00200006xx (00q00020006XX 0	00gD00100006XX	00q000200000XX	aD00100006xx

Site: Fire Training Area #: Level D Validation

Summary Table

	LOCATION:		MW-02-045						
-	ISIS ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	02MM045000060X 61447 # 09/11/91 09/16/91 10/17/91		5XX 02MU04600006XX 61448 # 09/11/91 09/16/91 10/17/91	6XX 02MW04700006XX 62067 # 09/18/91 09/23/91 10/23/91	36XX 02M4048000065X 62418 # 1 09/20/91 1 09/25/91 1 10/24/91	06DX 02MW04800006XX 62417 # 09/20/91 09/25/91 10/28/91	XX 02MU04900006XX 61131 # 09/10/91 09/15/91 10/09/91	X 04MN00100006XX 61958 # 09/17/91 09/23/91 10/21/91
-MOS	CROL								
3-Nitroaniline	20	•	•	•	•	•	•	•	•
Acenaphthene	£	•	•	•	•	•	•	•	•
2.4-Dinitrophenol	20		•	•	•	•	•	•	•
4-Nitrophenol	20	•	•	•	•	•	•	•	•
	2	•	•	•	•	•	•		•
2 / Siniteratelizate	2 \$		• •		•	•	. () (. (
2,4-Dinitrotoluene	25				•	•	•		
Uletnytphthalate	2:	•	•	•	•		1	•	•
4-Chlorophenyl-phenylether	29	•	•	•	•	•	•	•	•
Fluorene	2	•	•	•	•	•	•	•	•
4-Nitroaniline	2	•	•	•	•	•	•		•
4,6-Dinitro-2-methylphenol	20	•	•	•	•	•	•	•	•
N-Nitrosodiphenylamine	2	•	•	•	•	•	•	•	•
4-Bromophenyl-phenylether	2	•	•	•	•	•	•	•	•
Hexach orobenzene	2	•	•	1	8	•		•	•
Pentachlocophenol	20	•	•	•	•	•	•	1	•
Dhananthrana	9	•	•	•	•		•	•	•
Anthracene	2 2	0	8	•		•	•	•	•
Disparity of the late	2 5	0	0	•	•	•	•	•	•
Eliprophipa Company	2 5			•	•	•	•	•	•
Distriction of the second	2 5	•	•	•	•	• (. 1	
Pyrene	2\$,	•		•	•)	•	•
Butylbenzylphrhalare	2 6	•	•	,	1	•	•	•	•
5,5'-Dichlorobenzidine	2:	•	ŧ	•	9	•	•	•	•
Benzo(a)Anthracene	2:	•	•	•	•	ð	•	•	•
Chrysene	2	•		•		đ	•	•	•
bis(2-Ethylhexyl)phthalate	9	•	•	•	0	•		•	•
Di-n-octylphthalate	2	•	•	•	•	•	•	•	1
Benzo(b) Fluoranthene	\$	•		•	•	8	•	•	•
Benzo(k)Fluoranthene	9	•	•	•	e	0	•	•	•
Benzo(a)Pyrene	9	•	•	•	•	8	•	•	•
Indeno(1,2,3-c,d)Pyrene	9	•	•	•	•	•	•	•	•
Dibenz(a,h)Anthracene	9	•	•	•	•	•	•	•	•
Benzo(a.h.i)berylene	9	•	•	•	•	•	•	•	•
					H H H H H H H H H H H H H H H H H H H	11 11 11 11 11 11 11 11 11 11			11 11 11 11 11 11 11
Dilution	Dilution Factor:	1.00		1.00	1.00	1.00	1.00	1.00	1.00
•		6777				1	!	1	
Associated Method Blank: Associated Follioment Blank:	Blank:		81118 000000000000000000000000000000000	81119 81118 81118	\$574 0005003000	27117 2000500050000	P1175	11818	P1254
Associated Field	Blank	00000100006xx 0	000000100006XX	00000100000XX	000000200000XX	0000002000000XX	00000020000000000000000000000000000000	0000100006xx	000000200006xx

Summary Table

	LAB NUMBER: DATE SAMPLED: DATE EXTRACTED: DATE ANALYZED:	61959 # 09/17/91 09/23/91 10/23/91	61595 # 61595 # 09/12/91 09/16/91	61960 # 09/17/91 10/09/91	62069 # 09/18/91 09/23/91 10/25/91	61594 # 09/12/91 09/16/91 10/17/91
ANALYTE SOW-02/	/88 CROL					
				•		,
	01		•	*	•	c
bis(2-Chloroethyl)ether	10	•		œ	•	•
-Chlorophenot	10		•	œ	¢	•
Corobenzene	10	•	•	œ	•	•
1 4-Dichlorobenzene	10	•		œ	٠	•
A cobol	2		•	· 04		•
1 2-pichlosobenzene		•	•	•	•	•
Intel operation	2 5	•	•	œ	•	•
- Hetnytphenot	25		•	e Ga	•	•
Dis(2-Lntoroisopropyt)etner	25	•	•	c ca	•	
		•	•	ć Ou	•	
N-NILIOSO-UI-II-DI ODY LONINIE		•	•	e ca	•	•
Hexach Loroetnane	25	•	•	c cac	•	•
N I I ODEIIZEINE	2	•	•	: ex	•	•
2-Withophenol	2.0	•		: ec		•
2.4-Dimethylphenol	10		•	~		•
Benzole Acid	20	•	•	œ	•	•
bis(2-Chloroethoxy)methane	0	•	•	œ	•	•
lorophenol	0	•	•	∝	•	
1.2.4-Trichlorobenzene	10		•	∝	•	•
Nachthalene	10	•		œ		•
4-Chloroaniline	10	•		œ	•	•
Hexach Lorobutadiene	10	•	•	œ	•	•
-Chloro-3-Methylphenol	10			c x	•	•
2-Methylnaphthalene	10	•	•	œ	•	•
Hexach orocyclopentadiene	10	•	•	~	•	•
richlorophenol	10	•	•	œ	•	
2 4 S-Trichlorophenot	50	•	•	~	•	
2-Chloronarhthalene	10		•	œ	•	
-Nitroaniline	50			œ	•	•
Dimethylohthalate	10	•	•	~	•	•
Acenaphthylene	10		•	æ	•	•

Site: Fire Training Area #: Level D Validation

Summary Table

MM-16-001 61594 # 69/12/91 09/16/91 10/17/91			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	0	6	•	•	•	•	•	•	•	•	•	•	•	•	•	7	1.00	P1118 000S0020006XX	00aD00100006xx
MW-13-002 13MM00200006XX 62069 # 09/18/91 09/23/91			•	•	•	•		•		•	•	•		9	•		•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•		1.00		
MW-04-006 04HW00600006XX 61960 # 09/17/91 10/09/91		•	* 1	*	œ	œ	œ	œ	~	œ	œ	œ	~	œ	œ	œ	~	~	œ	œ	~	~	e	•	~	œ	œ	~	ac i	0 <	~	æ :	oz i	œ	1.00		00aD00200006XX 00
MV-04-005 04MU00500006XX 61595 # 09/12/91 09/16/91			•	•	•	•	•	•	•	•	•	•	•	0	•	•	0	•	6		•	•	•	•		•	•	•	•		•		•	•	tion Factor: 1.00 1.00 1.00		000D00100006XX 00C
MW-04-004 04MH00400006XX 61959 # 09/17/91 10/23/91			•	•	•	•		•	•	•	•	•	•	•		•	0	•	•	•	•			•	•	•	•	•	•		•	•		a	1.00	P1254 - 000	00aD00200006XX 00ar
LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED: DATE EXTRACTED:	CROL		2	10	20	20	9	9	2	2	2	20	200	2	2	2	05	2	2 5	2 5	2 2	2	:=	2 5	10	2	2	9	9	2	9	2	2	10	Factor:	d Blank: it Blank:	Blank:
	SOM-02/88				70			900	2 4	phenylether			ethylphenol	vlamine	henviether	De .	2 -	5		4	3,81		ototo	nidio	-		() phthalate	late	thene	thene		d)Pyrene	racene			Associated Method	Associated Field
	ANALYTE		3-Nitroaniline	Acenaphthene	2.4-Dinitrophenol	4-Nitrophenol	Dibenzofuran	2 4-Dinitrotoliene	Diethylphthalate	4-Chlorophenyl-shenylether	Fluorene	4-Nitroaniline	4.6-Dinitro-2-methylphenol	N-Nitrosodiphenylamine	4-Bromophenyl-phenylether	Kexach orobenzene	Dont och Orochopol	phenenthrana	Anthrocene	Airtii acene	Fluoranthene	Dyrana Birlicite	Putul benzul abthelete	7 7/20 chlorobon idina	Senzo(a) Anthracene	Chrysene	bis(2-Ethylhexyl)phthalate	Di-n-octylphtha	Benzo(b) Fluoranthene	Benzo(k)fluoranthene	Benzo(a)Pyrene	Indeno(1,2,3-c,d)Pyrene	Dibenz(a,h)Anthracene	Benzo(g,h,i)perylene		Assoc	

Summary Table

		LOCATION: ISIS ID: C LAB NUMBER: DATE SAMPLED:	MW-02-001)2MW00100006XX 62434 # 09/20/91	MV-02-001 02MV00100006XX 6245 # F 09/20/91	MW-02-003 02MW00300006XX 62494 # F 09/21/91	MW-02-003 02MM00300006XX 62501 # 09/21/91	MV-02-004 02MV00400006XX 62142 # F 09/19/91	MN-02-004 02MN00400006XX 62150 # 09/19/91	MW-02-005 02MW00500006XX 62143 # F 09/19/91	MW-02-005 02MW00500006XX 62151 # 09/19/91
ANALYTE	SOM-07/88	CROL						•		
			7410	•	2	~	•	•	•	•
Aluminum		9,5	2010		2 2	2	•	•	1	•
Antimony		35		•	ÉŽ	ž		•	•	•
Arsenic		2 6	•	•	2	X	•	•	•	•
5		90	•	•	<u> </u>	~	•	•	•	•
ELYICE THE		י ני	•	•	2	ž	•	•	•	•
		יניטי	72200	74000	ž	¥	•	•	•	•
		5		•	¥	22	•	•	•	•
Caromium		2 5	•	•	*	~	•	•	•	
Dace		, K	•	•	3	¥	•		•	•
index.		100	5730	•	¥	ž	•	•	•	•
		~	•	•	•	•	•	•	•	•
Megnes it m		2000	16900	15000	¥	ž	•	•	•	•
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inc inc		2.2	•	•	Z Z	¥	•	•	•	•
7.50		10			X.	×	•	•	NR NR	•

Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

00q000200006xx 00q000200006xx PBW34

PBW34

PBW32 000\$000000000 000000200000000

PBW32 000\$500400006xx 000000200006xx

PBW32 000\$00400006xx 000000200006xx PBW32 000\$000400006xx 000000200006xx

Site: Fire Training Area #: Level D Validation F: Filtered Sample

	ā	LOCATION: ISIS 10: LAB NUMBER: DATE SAMPLED:	MM-02-007 02MU00700006XX 62491 # F 09/21/91	MW-02-007 02MW00700006XX 62498 # 09/21/91	MW-02-009 02MM00900006XX 62148 # F 09/19/91	MW-02-009 02HW00900006XX 62157 # 09/19/91	MN-02-010 02MN01000006XX 62145 # F 09/19/91	MV-02-010 02MV01000006XX 62154 # 09/19/91	MW-02-011 02MW01100006xX 62492 # F 09/21/91	MV-02-011 02MV01100006xx 62499 # 09/21/91
ANALYTE	80N-07/88	CROL							•	
		500		4500		•	•	•	•	•
Alumina		3;	•	0461	1	1	1		ı	ı
Antimony		9	•	•	•	•	•	•	•	•
Arsenic		2	•	•	•	•	•	•	•	•
Barium		200	•		•	•	•	8	•	
Beryllium		2	•	•	•	•	•	•	•	•
Cachium		·	•	•	•	•	•	•	•	•
Calcium		2000	27500	33100	•	•	•	•	47000	78800
Chromiten		10	•	•	•	•	•	1	•	143
Cobalt		20	•	•	•	•		•	•	•
Concer		52	•	•		•	•	•	•	•
Iron		901	•	1980	•	•	•	•	589	1580
ead		m	•	•	•	•	4	•	•	•
Magnesium		2000	8720	0996	•	•	•	•	13700	13800
Manganese		15	90.5	141	В		•	•.	586	328
Vercury		0.5	•	0	6		8	•	•	•
Nickel		07	•	•	•	•	8	•	50.5	9.95
Potassium		2000	•	•	•	e	•	•	•	
Selenium		'n	•	•	8	0	•	•	•	•
Silver		9		•	•	8	•	•	• (• •
Sodium		2000	•	•	•	•	•		42100	43500
Thallium		9	•		•	•	•	•	•	•
Vanadium		20	•	•	•	•	8	•	•	•
Zinc		20		•	•		•	•	•	•
Cvanide		2		•		•	•		•	

 PBU32
 PBU32
 PBU34
 PBU34

 00QS00400006XX
 00QD00200006XX

 00QD00200006XX
 00QD00200006XX
 00QD00200006XX

Site: Fire Training Area #: Level D Validation F: Filtered Sample 1

Summary Table

ANALYTE SOW-07/88 CROL Aluminum 200 209 Antimony 60 - Arsenic 80 - Barium 500		2130		70600	71100		
200 60 100 500 500 100 100 500 150 150 150 15		2130		70600	71100		
500 200 500 500 500 100 500 150 150 150 150 1		79800		70600	71100		
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0		79800	00992		71100	, , ,	•
200 5000 100 500 250 250 250 250 250 250 250 250 2		79800	26600	00902	71100	11.6	13.7
2.000 000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.		79800	- 00992 -	00902	71100	•	•
200 50 50 250 250 250 250 250 250 250 25		79800	76600	70600	71100	•	
5000 25 25 25 25 200 300 5000		79800	- -	00907	71100	• • • • • • • • • • • • • • • • • • • •	
50 255 200 200 200 200 200		t •	•	•	•	82400	85100
50 100 3 5000 15		•				•	•
25 100 3 5000 15			•	•	•	•	•
100 3 5000 ie	•	•	•	•			
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ē.	26200	20200	00061	00861	00051	18500	1000
	2750	220	•	י וכו	198	477	CIZ
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		•	•	•	•	•	•
9	•	•	•	• !	• •		1 6
	26400			10600	11100	0118	8390
Thattium 10	•	•	•	•	•	•	•
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de 10		•	•	•	•	•	•

PBU33 PBU33

Summary Table

		ISIS ID: LAB NUMBER: DATE SAMPLED:	MW-UZ-UZ1 02MW0Z100006XX 62081 # F 09/18/91	MM-UZ-UZ1 02MW0Z100006XX 62090 # 09/18/91	MW-02-022 02MW02200006DX 62083 # F 09/18/91	MV-02-022 02MV02200006DX 62092 # 09/18/91	MW-02-022 02MW02200006XX 62082 # F 09/18/91	MV-02-022 02MU02200006XX 62091 # 09/18/91	MV-02-023 02MV02300006xx 62079 # F 09/18/91	MV-02-023 02MV02300006XX 62088 # 09/18/91
ANALYTE	SOW-07/88	CROL								
Aliminim		200				;				
Antimony		007	đ	a	•	3550	•	4980	•	•
Anchiony		00	•	•	•	•	•	•	•	•
Arsenic		2	•	•	•	•	•	•		1
Barium		200	•	•	•	•	•	1 (•	•
Beryllium		5	•	•	•	•) (•	•	•
Cadmium			•	•	•	•	• (•	•	•
Catcium		2000	64.800	42000	43000	70107	00007			1 (
Chromium		10	34.55	48.4	800		23.0	0000	39500	40100
Cobalt		2 5	•	3	0.41	0.0	36.0	46.5	50.6	28.2
Copper		ς Κ	•	•	• 1	•	•	•	•	
1001		3 5	101			• 6	• •	•	•	•
pad		3*	6	650	404	5190	907	6100	112	182
Magnesism		700	20500	00200			• •	•	•	•
malical da		0000	r nnene	29300	27100	26400	26600	29000	14400	14500
Manganese		5	115	110	246	307	241	338	7.99	7 09
Mercury		0.5	•		•	ı		} •		***
Nickel		07	•	•	•	â	e	•	•	
Potassium		2000	•	•	•	•	•	•	1 (•
Selenium		2	•	•	. •	0	٠	• •	1	•
Silver		10	•	٠	•	•	•	' '	•	•
Sodium		2000	5500	6440	•	1	. (0763	•	•
Thatliem		Ç					1	0070	•	•
Variable		2 5			•	•	•	•	•	•
7,10		2 6	•	•	•	•	ē		•	•
71nc		25	•	•	•	•	•	•	•	•
Cyanide		9	•	•		•	,	•	•	1

Site: Fire Training Area #: Level D Validation F: Filtered Sample

PB5530W PB5530

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		LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED:	MU-02-024 02MU02400006XX 62149 # F 09/19/91	MW-02-024 X 02MW02400006XX 62158 # 09/19/91	MW-02-026 (X 02MV02600006XX 62432 # 09/20/91	MA-02-026 X 02MV02600006XX 62443 # F 09/20/91	MN-02-027 XX 02MU02700006XX 62431 # 09/20/91	MV-02-027 XX 02MV02700006XX 62442 # F 09/20/91	MN-02-028 XX 02MN02800006XX 62147 # F 09/19/91	MA-02-028 XX 02MM0280006XX 62156 # 09/19/91
ANALYTE	SON-07/88	CROL								
			,	•	•	•	•	•	•	•
Aluminum		007	•	•	•	•	•	•	•	•
Antimony		3:	•		•	•	•	•	•	•
Arsenic		우	•	•	• 1	•	1290	37,60	•	•
Barium		200	•	•	• 1	•		•	•	•
Beryllium		'n	•	•	•	•	•	•	•	•
Carling		ب	•		00,00	77500	452000	725000	•	•
Colcium		2000	•	•	00.04	000		•	•	•
Chromium		2	•	•	•	•	•	•	•	•
Cobalt		2	•	•	•	•	•	•	•	•
Conner		52	9	•	. !	•	•	•	•	•
		100	•	•	551	•	•	•	•	•
200		m	•	•		47000	•	•	•	•
Magnesium		2000	•	•	nocy	900	•	•	•	•
Manganese		15	•	•	•		•	•	•	•
PECULY		0.2	•		•	•	•	•	•	•
Vickel		07	•	•	•	•	13000	115000	•	•
Potassium		2000		•	•	•	•	•	•	•
Selenium		'n	•	•	•	•	•	•	•	•
Silver		2	•	•	10,000	10200	00500	82600	1	•
Sodium		2000	•		20101		•	•	•	•
Thallium		2	•	•	•	•	•	•	•	•
Vanadium		20	•	•	•	•	•	•	•	•
Zinc		02	•	•	•	•	•	•	•	•
Cyanide		9	•						11 11 11 11 11 11 11 11 11 11 11 11 11	11 11 11 11 11 11 11 11 11 11 11 11
## ## ## ## ## ## ## ## ## ## ## ## ##		t t t t t t t t t t	11 11 11 11 11 11 11 11 11 11 11 11	7 8 6 6 6 6 7 7 8 8 8 8 8 8 8 8 8 8 8 8						
	Associated Method Blank:	Blank:	PBV32	PBW32	PBV33 000S0050006XX	PBW33 000\$0050006xx	PBM33 00050050006XX	PBU33 000S0050006XX	PBW32 000\$00400006XX	PBW32 000200400006XX
•	Associated Equipment Associated Field	Biank:			•	•	•	•	0000007000000	000000000000000000000000000000000000000

Site: Fire Training Area #: Level D Validation F: Filtered Sample

		- NCATION-		MU-02-020		MU-02-030	MU-02-031	MU-02-031		MU-02-017
		ISIS ID: LAB NUMBER: DATE SAMPLED:	09/19/91	02/NU0290006XX 62155 # 09/19/91	02MH03000006xx 62436 # 09/20/91	02MU3300006XX 62447 # F 09/20/91	02MU03100006XX 62493 # F 09/21/91	02MW03100006XX 62500 # 09/21/91	02MU03700006XX 61132 # 09/10/91	02MU0370006XX 61136 # F 09/10/91
ANALYTE	SOW-07/88	CROL								
Aliminim		200	•	٠	•	•	•	•	•	•
Antimony		9	•	•	•	•	•	•	•	•
Arsenic		2	•	•	•		21.5	20.6 J	•	•
Barium		500	•	•	•	•	•		•	•
Beryllium		'n	•	•	•		•	•	•	•
Cadmium		S	•	•	•	•	•	1	• •	•
Calcium		2000	•	•	37000	37000	112000	111000	006/9	99200
Chromium		£	•	•	•	•	•	•	•	•
Cobalt		20	•	•	•	g	•	•	•	•
Copper		52	•	•	•	q	•	•	•	4
5		90	•	•	238		23400	23200	•	•
Lead		₩	•	•	•	8 1	•	• ;		
Magnesium		2000	0	•	13200	13200	17000	16900	25500	25500
Hanganese		2	8	•	154	148	104	104	•	•
Mercury		0.5		•	•		•	•	•	•
Nickel		0%	•		•	e		•	4	•
Potassium		2000	•	•	•	•	•	8	•	•
Selenium		. ~	•	•	•	8	0	•	•	•
Silver		9	•	•	•	•	• •	• ;	• • •	
Sodium		2000	•	•	•		9530	9350	11400	10500
Thallium		10	•	•	•	•	•	•	•	
Vanadium		20	•	•	•	•	•	•	•	•
Zinc		20	•	•	•		•	•	•	
Cyanide		9	•		•	•		•		•

Site: Fire Training Area #: Level D Validation F: Filtered Sample

PBLK26,27

PBH34 PBH36, PBLK26,27
00qD00200006XX 00qD00100006XX

PBU33 PBU33 PBU33 PBU33 009S0006XX 009S00500006XX 0009S00500006XX

PBW32 00QS00400006XX 00QD00200006XX

Associated Method Blank:
Associated Equipment Blank:
Associated Field Blank:

PROJECT: Plattsburgh A.F.B. - Fall of 1991

		LOCATION: ISIS ID: LAB NUMBER: DATE SAMPLED:	MW-02-038 02MM03800006XX 61133 # 09/10/91	MW-02-038 02MW03800006XX 61137 # F 09/10/91	MW-02-039 02MW03900006XX 61961 # 09/17/91	MV-02-039 02MW03900006XX 61968 # F 09/17/91	M4-02-040 02M404000006XX 61603 # F 09/12/91	MW-02-040 02MW04000006XX 61608 # 09/12/91	MW-02-041 02MW04100006DX 61963 # 09/17/91	MW-02-041 02MW04100006DX 61970 # F 09/17/91
AKALŸTE	SOW-07/88	CROL								
			•	•	•	•	•		•	•
Aluminum		9		•	•	•	•	•	•	
Antimony		2 4	• •	•	Б	•	•	•	•	•
Arsenic		26	•			•	•	•	•	•
Barica		700	•		1		•	•	•	•
Beryllium		ın ı	•	•			•	•	•	•
Cadmium		<u>ر</u>	•		00033	66.00	VVOYY	47400	01800	93200
Celcium		2000	000//	00567	00000	00400				
Chromium		9	•	•		•		•	•	
Cobalt		20	•	•	•	•	•	• •		•
Copper		22	•		•	•	•	•	1	, ,
Lon		100	819	891	•	•	•	•	•	•
Lead		m	•	•	•		, 0000	. 00,00	75500	75000
Magnesium		2000	31000	32200	21500	21600	00707	00407	45300	146
Manganese		5	238	543	7.5	0.0	1	1	127	2
Mercury		0.5	•	•	•	•	•	•	•	
Nickel		0,	•	•	•	•	•			
Potassium		2000	•	•	•	•	•	• •		•
Selenium		'n	•	•	•	•	•	•		•
Silver		2	•	•	•	•	в	•	07.70	02.70
Sodium		2000	00999	9249	•		•	•	0400	0.50
Thattium		2	•	•	•	•	•	•	•	•
Vanadium		20	•	•	•		•	•	•	•
7 inc		20	•			•	•	•	•	•
Cyanide		9	•	8		•	•	•	•	•

Site: Fire Training Area #: Level D Validation F: Filtered Sample

PBW30

00QS00200006xx 00QS00200006xx 00QD00200006xx 00QD00100006xx 00QD00100006xx 00QD00200006xx 00QD00200006xx

PBM30

PBW30

PBLK26,27

00000100000xx PBLK26,27

Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

009D00200006xx 009D00200006xx

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Summary lable

		LOCATION: 1SIS 1D: LAB NUMBER: DATE SAMPLED:	MM-02-041 02MH04100006XX 61962 # 09/17/91	MW-02-041 02MW04100006XX 61969 # F 09/17/91	MV-U2-U42 02MU04200006XX 61602 # F 09/12/91	MM-U2-U42 02MW04200006XX 61607 # 09/12/91	MA-02-043 02MW04300006XX 61964 # 09/17/91	AN-U2-U43 02MU04300006XX 61971 # F 09/17/91	MW-02-044 02MW04400006XX 61134 # 09/10/91	MN-02-044 02MW04400006XX 61138 # F 09/10/91
ANALYTE	80/1-07/88	CROL								
Alimican		200	•	•	•	•	•	•	•	•
Antimony		9		•	•		•	•		•
Arsenic		2	•	•	•	•	•	•	•	•
Barium		500	•	•	•	•	•	•		•
Beryllium		٠		•	•	•	•			•
Cadmium		S	•	•	•	•		•	•	
Calcium		2000	91100	92000	39100	42000	89500	89100	121000	123000
Chromium		2	•	•	•	•	•	•	12.9	•
Cobalt		20	•	•	•	•	•	•	•	•
Copper		23	•	ı	•	•	•	•	e	•
Iron		100	•	•	533	584	8	•	•	•
Lead		m			•	•	8.2	•	•	•
Hagnesium		2000	45200	45600	12700	13600	28000	27800	32700	32400
Manganese		5	153	145	338	362	297	787	213	232
Mercury		0.2	•	•	•		•	•	•	•
Nickel		70	•	•	•	•	•	•	•	•
Potassium		2000	•	•	•		•	•	•	•
Selenium		'n		•	•	•	•	•	•	1
Silver		2		•	•	•	•	•	•	•
Sodium		2000	8350	8450	•	•	•	•	•	2690
Thattium		2		•	•	1	•	•	•	•
Vanadium		20		•	•	•	6	đ	•	•
Zinc		20			•	0		•	•	•
Cyanide		9	•	•	•	•	•	•		

PBW30 PBW30 PBLK26,27
00qD00200006XX 00qD00100006XX 00q\$00200006xx 00q\$000100006xx 00q\$000100006xx 000D002000D00 xx9000050000000 PBW30 PBW30 Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

PBLK26,27

Summary Table

		LOCATION: 1S1S 1D: LAB NUMBER: DATE SAMPLED:	MW-02-045 02MW04500006DX 61451 # 09/11/91	MW-02-045 02MW04500006DX 61516 # F 09/11/91	MW-02-045 02MW04500006XX 61450 # 09/11/91	MW-02-045 02MU04500006XX 61515 # F 09/11/91	MW-02-046 02MU04600006XX 61452 # 09/11/91	MV-02-046 02MV04600006XX 61517 # F 09/11/91	MW-02-047 02MV04700006XX 62078 # F 09/18/91	MW-02-04/ 02MW04700006XX 62087 # 09/18/91
AHALYTE	SOM-07/88	CROL								
1.0		200	•		•	•	•	•		•
At Call Proper		3	•	4	•	•	•	.4	•	•
Ant Illiony		32	•	•		•	•	•		•
Jarin C		200	•	•	•	•	•	•	•	•
Bervilia		2		•	•	•	•	•		•
admirm		ب	•	•	• !	•	• 60,71	00274	00002	00227
alcium		2000	76100	75600	75800	0025/	20400	00040	23 7	24.4
hromium		2	75.3	•	•	•	•	•	23.6	9.00
Cobalt		20	•	•	•	•	•	• 1	. (•
Jecto		52	•	•	•	• •	•		1	
Lon		90	2050	4120	4540	7390	•	979	• •	
pead		₩	•	•	• •	a (00207	00707	1000
Asgnesium		2000	25100	26100	26000	26100	20202	19/00	1,000	27.4
fanganese		5	739	672		707	25.	A IC	747	
fercury		0.2	•	•	•	•	0.21		1	•
Nickel		07	40.3	•	•	•	•	•	•	•
otassium		2000	•	•		6	•	•		•
Selenium		~	•	•	•	•	•	. (•	•
Silver		2	•	•	•	•	00101	00101	00626	21800
Sodium		2000	•	•	•	•	00501	2	2250	-
Thallim		-01	•	•	•	•	•	•	3	•
/anadim		20	•	•	•	•	•	4	•	
7 inc		50	•	•	•	•	•	•	•	•
Cvanide		2	•	•		•	•	•	•	•

Associated Method Blank: PBLK26,27 PBLK26,27
Associated Equipment Blank: 00aS00100006xx
Associated Field Blank: 00aD00100006xx
Site: Fire Training Area
#: Level D Validation
F: Filtered Sample

Summary Table

MW-04-001 04MW0100006XX 61972 # F 09/17/91		•	•	•	•	•	•	62500	•	•	•	•	•	9620	456	•	•	•		•	•	•	•	•	•	11 14 14 14 14 14 14 14 14 14 14 14 14 1
MW-04-001 04MW0100006XX 61965 # 09/17/91		310	•	•	•		•	93200	•		•	332	,	9610	453	•	•	•	•			•	•	•	•	
MW-02-049 02MW04900006XX 61139 # F 09/10/91		•	•	14.2	•	•	•	25400	•	•	•	94800		22100	4670			•	•	•	0209	•	•	•		
MW-02-049 02MW04900006XX 61135 # 09/10/91		1050	•	15.2	•			25700	•	•	•	94800		22200	4710	•		•	•	•	5910	•	•			
MV-02-048 02MV0480006XX 62439 # F 09/20/91		•	•	•		•		20400		•	•	3470		13300	673		•		0		•	•	•	¢		######################################
MW-02-048 02MW0480006XX 62428 # 09/20/91		•	•	٠	•	•		20000				3440	•	13500	591		•			•	ø	•	•	•	•	11 ·
MW-02-048 02MW048000060X 62440 # F 09/20/91		•	•	•			•	00565	•	•	•	3270	•	13300	809	•	1	•	٥	a	•		•	•	•	## ## ## ## ## ## ## ## ## ## ## ## ##
MW-02-048 02MU04800006DX 62429 # 09/20/91		•	•	٠			•	20000	•	•	•	3440		13300	. 641	,	•	•	•	•	•	•	•			
LOCATION: 1SIS ID: LAB NUMBER: DATE SAMPLED:	CROL	200	9	£	200	ĸ	'n	2000	2	20	\$2	100	m	2000	5	0.5	40	2000	ď	9	2000	2	20	20	10	
	80/1-02/88																									771 1111 1111 1111 1111 1111 1111 1111
	ANALYTE	Atominom	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromica	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thatlium	Vanadium	Zinc	de	## ## ## ## ## ## ## ## ##

PBU33 PBU33 PBU33 PBU33 PBU33 PBU33 PBU33 PBU33 PBLK26,27 00qS00500006xx 00qS00500006xx 00qS00500006xx - 00qD00100006xx Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

00aD00200006xx 00aD00200006xx

PBLK26,27

Summary Table

		ISIS ID: LAB NUMBER: DATE SAMPLED:	04MU00400006XX 61966 # 09/17/91	04MV00400006XX 61973 # F 09/17/91	04MU00500006XX 61600 # F 09/12/91	04MU00500006XX 61605 # 09/12/91	04MU06U0006XX 61967 # 09/17/91	09/17/91	15MW0400005X 62080 # F 09/18/91	62089 # 62089 # 09/18/91
ANALYTE	SOM-07/88	CROL								
								•	•	•
Alimina		200	1780	•	•	552	•	•	1	
Antimony		9		•	•	•	•		•	
Arsenic		2	•		8	•	•	•	•	•
Bering		200		•	•	•	•	•	•	
# 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		•		•	•	•	•	•	•	•
			•	•	•	•	•		• 1	• 6
Cadmium		2005	69800	00269	88900	86900	70100	70300	29800	29500
Catchan		2	•	•	•	•	•	•	34.0	34.8
Caronium		2 5		•	•	•	•			
Copari		2 4	•	•	•	•		•	•	•
Copper		35	0757	2210	•	1830	3070	2900	315	304
Loui		2 ~		•	•	19.5	•	•	•	•
Lead		יני	15300	14600	21600	21300	24200	54400	20800	20700
Ragnesium		5	0772	3480	1620	1570	12100	12100	632	809
Hanganese		20	,	•	•	•	•	•	•	•
Mercury		3.0	•	•	•	•	•	•	•	
Nicket		ני ט	8020	8150	•	•	•	•	•	•
Potassium		, r	'	•	•	•	•	•		•
Selenium		, 5	•	•	•	•	•	•	•	•
SILVER			•	•	•	•	•	•	•	
Sodium		0000			•	•	•	•	•	•
Thallium		2;	•		1	•	•	•	•	•
Vanadium		20	•	•	•	1 46		•	•	•
Zinc		50	•	•	•	4.12	i d		•	•
Cvanide		2	•		•					

009D002D0000XX 009D002D0000 PBW30 PBW30

PBLK28, 29 000\$00200006xx (

Site: Fire Training Area #: Level D Validation F: Filtered Sample

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MW-16-001 16MW00100006XX 61604 # 09/12/91 LOCATION: MW-16-001 ISIS ID: 16MW00100006XX LAB NUMBER: 61599 # F DATE SAMPLED: 09/12/91

ANALYTE	SOM-07/88	CROL		
Aluminum		200	•	•
Antimony		9		•
Arsenic		우		
Barium		200		•
Beryllium		'n		•
Cachium		'n	•	•
Calcium		2000	127000	131000
Chromicm		2	•	
Cobalt		20		•
Copper		52	•	•
Iron		001		829
Lead		٣	•	•
Magnesium		2000	20500	21000
Hanganese		5	3060	3230
Mercury		0.5		•
Nickel		0,4	٠	•
Potassium		2000	959	0609
Selenium		S	6	•
Silver		10		•
Sodium		2000		•
Thattium		£	•	
Vanadium		20		•
2 inc		20	•	•
Cyanide		2	•	•

Associated Method Blank: Associated Equipment Blank: Associated Field Blank:

PHASE I REMEDIAL INVESTIGATION SURFACE WATER/SEDIMENT